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Cotton

Market Setting, Trade Policies, and Issues

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PREFACE

The objective of this paper is three-fold. First, it highlights the main aspects and characteristics of the global cotton market by analyzing developments of the past 40 years. Second, it identifies the policy distortions in the cotton market including their impact on prices and trade as well as the prospects for reform. Third, it discusses a number of policy alternatives for both developing and developed cotton producing countries.

The paper is divided into four parts. The first part (5 sections) discusses nature of the fiber market, the global balance of the cotton market, price trends and variability, the nature and degree of dependence of developing countries on cotton, nonconventional cotton production practices, and the secondhand clothing market.

The second part (4 sections) deals with distortions and reforms in the cotton market. Specifically the first section discusses the distortions in the cotton market by major producers including the United States, the European Union, China, and Uzbekistan. The next section summarizes the preferential arrangements that indirectly affect the cotton market, namely the Agreement on Textiles and Clothing and the Africa Growth and Opportunity Act. The third section looks at the impact of distortions and prospects for reforms. The last section discusses the reforms initiatives in East and West Africa.

The third part of the paper synthesizes the issues and stylized facts. It also discusses some policy directions for both developing and developed cotton producing countries including cotton promotion, deepening of policy reforms in developing countries and reduction (and eventual elimination) of support by major subsidizers.

The fourth part consists of five technical appendices and one statistical appendix. The technical appendices describe the methodology of calculating the concentration indices, the model which estimates the growth rates, the measures of price variability, the measure of world price, and issues related to cotton risk management. The statistical appendix consists of 13 tables reporting figures on the global balance of production, consumption, and trade, monthly prices since 1950, global production and consumption of chemical fibers, value of exports of secondhand clothing, a chronology of the US commodity programs with cotton provisions, and data on subsidies.

SUMMARY

The value of world cotton production in 2000/01 has been estimated at about $20 billion, down from $35 billion in 1996/97 when cotton prices were 50 percent higher. Although cotton's share in world merchandize trade is insignificant (about 0.12 percent), it is very important to a number of developing countries. Cotton accounts for approximately 40 percent of total merchandise export earnings in Benin and Burkina Faso, and 30 percent in Chad, Mali, and Uzbekistan. Its contribution to GDP in these and other developing countries is substantial ranging between 5 and 10 percent. Cotton supports the livelihoods of millions in developing countries (at least 10 million in West and Central Africa) where it is a typical, and often dominant, smallholder cash crop. The cotton market also has been subject to considerable market intervention—subsidization in the US and EU and taxation in Africa and Central Asia. During the last three seasons, annual direct support averaged $4.5 billion. This paper reviews the market setting and the policy issues, and also gives recommendations on how developed and developing cotton producing countries can improve the policy environment.

THE MARKET SETTING

Global cotton production doubled from 10 million tons in 1960 to 20 million tons in 2001. More than three-quarters of cotton output is accounted for by developing countries. China and the United States each account for approximately 20 percent of world output, followed by India (12 percent), Pakistan (8 percent), and Uzbekistan (5 percent). Other significant producers are seven Francophone African countries, Turkey, Brazil, Australia, and Greece accounting for a combined 20 percent. Most of the growth in cotton production came from China and India which tripled and doubled their production during this 40-year period, respectively. Other countries which significantly increased their share of cotton production were Turkey, Greece, and Pakistan. Some new entrants also contributed to this growth. Australia, for example, produced only 2,000 tons of cotton in 1960 while it averaged 650,000 tons during the late 1990s. Francophone Africa started with less than 100,000 tons in the 1960s and it now produces almost one million tons. The United States and the Central Asia Republics (then part the Soviet Union), which were the two dominant cotton producers during the 1960s, have retained their output levels at about 3.5 and 1.5 million tons respectively, thereby halving their shares. A number of Central America countries, on the other hand, lost substantial share of world output.

Approximately, one-third of cotton production is traded internationally. The four dominant exporters—United States, Uzbekistan, Francophone Africa, and Australia—account for more than two-thirds of global exports. Four major producers, China, India, Pakistan, and Turkey are generally net importers of cotton to supply their textile industries. Imports of cotton are more uniformly distributed than exports. During the 2000/01 season, the eight largest importers (Indonesia, India, Mexico, Thailand, Turkey, Russia, Italy, Korea), accounted for over half of world cotton imports. Apart from Russia, which

prior to 1990 was considered a major producer but not an importer since the Central Asian cotton production was considered domestic trade, most of the remaining cotton importers are new in the sense that have been importing cotton to supply their newly-developed textile industries. Four East Asian textile producers (Indonesia, Thailand, Taiwan, and Korea) accounted for less than 3 percent of world cotton imports in 1960. Their share in 2002 was 22 percent.

A recent survey (based on a questionnaire of 28 cotton producing countries) on costs of cotton production suggests that West Africa (especially Benin, Mali, and Burkina Faso), Uganda, Tanzania, are among the lowest cost producers. High cost producing countries are the United States, Israel, and Syria. The two European cotton producers, Greece and Spain, are probably the world's highest cost cotton producers although they did not participate in the survey.

In line with most primary commodities, real cotton prices have declined considerably during the last half century; they are currently one fifth of their 1950 levels. This decline has been characterized by considerable year-to-year variability, especially during the last quarter of the century. In particular, cotton prices followed a smooth declining pattern throughout the 1950s and 1960s. They increased sharply after the 1973 and begun declining again albeit with much higher volatility than the pre-1973 decline. A structural break in cotton prices appears to have taken place in 1985 when the United States changed the nature of its support policies—from stockholding to price support. Real prices have been declining less rapidly since 1985, while volatility has been reduced compared to 1973-1984. However, the post-1985 price volatility is about twice as high compared to the pre-1973 price volatility.

The cotton market has been significantly affected by the rapid expansion of chemical fibers, mainly polyester. Chemical fibers account currently for almost 60 percent of global fiber consumption, up from 33 percent in 1960. Global production of chemical fibers reached 30 million tons in 2002. Polyester prices were 4 times higher than cotton prices in the early 1960s. Following technological improvements they declined to the level of cotton prices in the early 1970s and since then polyester and cotton products have been trading at similar price levels. Most chemical fibers are produced in Asia. For example, Asia's output of chemical fibers in 1960 was 2.4 million tons while global production in that year stood at 10.3 million tons; it reached 20 million tons in 2000 compared to 28.3 million tons of global output.

The long term decline in cotton prices has been aided by technological improvements such as application of improved varieties, fertilizers, chemicals, irrigation, and (in the case of some developed countries) mechanical harvesting. Between 1960 and 2000 world cotton yields doubled, from 300 to 600 kilograms per hectare, implying an annual growth rate of 1.8 percent. More recent developments in technology such as genetically modified seeds and precision farming are likely to further reduce the costs of producing cotton. In 2002, genetically modified cotton accounted for almost 30 percent of global cot-

ton output. The United States is the heaviest user with more than 70 percent of its cotton area allocated to genetically modified cotton, followed by Australia (40 percent), China (20 percent) and more recently by India. If current trends continue, half of the world's cotton will be of genetically modified origin within five years. Organic cotton, another "non-conventional" way of producing cotton, has been tried on a limited scale; the outlook, however, looks less promising compared to food crops mainly because of weak demand; it appears that there is too great a distance between the primary commodity—cotton—and the final product—cloth—in the eyes of the consumer.

Cotton consumption between 1960 and 2000 grew by an annual average of 1.8 percent, i.e. approximately at the same rate as the population growth, implying zero per capita growth. Consumption of chemical fibers, on the other hand, has grown by 4.7 percent per annum (or about 3 percent in per capita terms). Therefore, all per capita growth in total fiber consumption during the last 40 years has been accounted for by growth in the consumption of chemical fibers.

THE POLICY SETTING

Although there are no significant border policies such as quotas or high tariffs, a number of cotton producing countries use domestic measures to support their cotton sector. According to the International Cotton Advisory Committee, support during the 2001/2002 totaled $5.8 billion. These numbers, however, must be treated with caution for two reasons. First, China has reportedly supported its cotton sector by an estimated $1.3 billion annually during the last three seasons, but it is difficult to substantiate such support since Chinese cotton policies are too complex to be assessed quantitatively and the official figures are sometimes unreliable. Second, the ICAC figures for the United States do not include all types of transfers. A more comprehensive look indicates that US support is higher than what ICAC reports.

Support in the United States is given in various forms. The six most important components of support are the loan deficiency payments, marketing loan program, production flexibility contracts (i.e. decoupled support introduced with the 1996 Farm Bill which replaced deficiency payments), counter-cyclical payments (i.e. emergency payments introduced in 1998 in response to low prices), insurance, and Step-2 payments (often referred to as export subsidies.) During the 2001/02 season producer prices in the United States were 91 percent higher than world prices. Support in the European Union (i.e. Greece, and Spain) is given in the form of guarantee prices (i.e. the difference between a pre-announced target price and the market price). During the 2001/02 season producer prices in Greece and Spain were 144, and 184 per cent higher than world price, respectively.

The current low cotton prices, which have been influenced by the support provided by major players, have taken a toll on the rural sector of cotton-dependent countries. Research findings indicate that in Benin, where cotton accounts for 40 percent of total mer-

chandise exports and contributes more than 7 percent to GDP, a 40 percent reduction in farmgate cotton prices—equivalent to the price decline that took place from December 2000 to May 2002—implies a 7 percent reduction in rural per capita income in the short run and 5-6 percent reduction in the long run. Furthermore, the incidence of poverty among cotton growers in the short run rises from 37 percent to 59 percent while the average incidence of rural poverty (i.e. including cotton growers and other farmers) rises from 40 percent to 48 percent.

In addition to low prices and loss of export shares by non-subsidizing producers, support by major players has triggered a number of noteworthy reactions.

- Many cotton producing countries have reacted by introducing offsetting support. Turkey, Brazil, Mexico, Egypt, and India, totaled $0.6 billion of support during 2001/02.
- Brazil has initiated a WTO consultation process claiming losses to its cotton exports due to subsidies by the United States.
- Four West African cotton producing countries (Benin, Burkina Faso, Chad, and Mali) are pressing for removal of support to cotton sector through the WTO. In an unusual move, the President of Burkina Faso addressed the WTO on June 10, 2003, asking for financial compensation for cotton producing low-income countries to offset the injury caused by support. The requested compensation was to be in place for as long as subsidies are in place.
- The cotton sector has found an unlikely ally in the Director General of the International Rayon and Synthetic Fibres Committee. In a letter to the *Financial Times* on June 12, 2003 he complained that "recent increases in cotton subsidies have rigged the market even more dramatically in favor of cotton, depressing demand for every substitute product. The result is industrial plants being kept idle… that were built in legitimate expectation that the competitive advantages of manufactured fibers would create demand to fill the capacity…"

Removal of support is expected to reduce production and consequently boost prices. Simulations show that if full liberalization in the cotton sector takes place including removal of both trade barriers and production support (along with liberalization in all other commodity sectors), cotton prices would increase in the next 10 years by an average of 12.7 percent over the price that would have prevailed in the absence of reforms. World cotton trade would increase by 5.8 percent while Africa's cotton exports would increase by 12.6 percent. Uzbekistan would increase its exports by 5.8 percent, Australia by 2.7 percent, while exports from the United States would decline by 3.5 percent. Cotton production in the Unites States and the European Union would decline by 6.7 and 70.5 percent, respectively—in effect, cotton production in the European Union would fall to levels even below those prior to the Common Agricultural Policy taking effect. Production in Uzbekistan and Africa would increase by 4 and 6 percent, respectively.

However, complete elimination of support is unlikely. The European Union reformed its cotton policy regime in 1999 and is unlikely to eliminate support because: (i)

none of the candidates to join the Union in the current expansion are cotton producers and hence there will be no pressure to increase the budgetary allocation to the cotton sector and (ii) the current cotton program is viewed as a poverty reduction mechanism since the support supposedly goes to low-income regions of Southern Europe. The United States approved the *2002 Farm Bill* which, in effect, legitimized the emergency payments that had been given to its cotton (and other commodity) growers following the 1997/98 price decline; it also established a minimum price of $0.71 per pound (or $1.56 per kilogram, much higher than the 2001 and 2002 world averages of $1.06 and $1.00 per kilogram). The *2002 Farm Bill* will be in place for the next 6 years, consequently guaranteeing US cotton growers generous support until the year 2007, if the current low prices persist (some support will be in place even if prices increase considerably).

The cotton market has also been affected indirectly by the Agreement on Textiles and Clothing (the successor of the Multifibre Arrangement), which through quotas and tariffs on textiles and apparel has influenced the location of the textile industry, consequently imposing an implicit tax on cotton goods. The Agreement is expected to be phased out by the end of 2004. However, it is back-loaded with most of the reforms expected to take place at the end of 2004, thus introducing the risk of non-compliance. The Africa Growth and Opportunity Act may also help many African cotton producing countries to expand their textile exports to the United States and thereby increase domestic cotton consumption. For example, currently, the average duty to garment imports into the US is 17.5 percent. Under the *Act*, apparel imports into the United States from the 14 eligible African countries will be duty free subject to an upper limit of 3 percent of total US apparel imports. Since total trade in clothing from Africa to the US is very small, the 3 percent cap (to increase to 7 percent by year 7) is unlikely to become a binding constraint. Another beneficial provision is that for countries with Less Developed status, there is a 4-year exception to the rule of origin (it expires in 2004). For example under this provision, Tanzania, can import yarn from China and export cloth to the US. However, it should be noted that while local cotton consumption may increase due to the *Act*, global consumption is unlikely to be affected in any significant way.

A number of cotton producing countries (especially in Sub-Saharan Africa) which traditionally had been taxing their cotton sectors, undertook substantial policy reforms during the 1990s in order to increase the efficiency of the cotton sectors. These reforms have been supported, in part, by multilateral institutions, including the World Bank. In most occasions reforms were the only feasible alternative because the parastatals handling the marketing and trade of cotton were crippled by huge debts and either went bankrupt or they managed to stay alive with state infusions of capital. This, in turn, was caused by falling world cotton prices, inefficiencies and poor management of the parastatals and often outright corruption.

Substantial reforms were undertaken by countries in Eastern and Southern Africa, namely Tanzania, Uganda, Zambia, and Zimbabwe. With the exception of Tanzania

(where the reform process was never completed), considerable supply response took place along with higher share of export prices and timely payments to growers. There have been numerous reports that the quality of cotton declined after reforms, but these reports have been unsubstantiated. West African cotton producers are also contemplating reforms. Central Asian cotton producers, especially Uzbekistan, still tax heavily their cotton sectors and reforms are unlikely to take place soon.

Market Outlook and Policy Options

The prospects for growth in cotton consumption are similar to the patterns followed in earlier decades. Pressure from chemical fibers is likely to remain strong as technological improvements are likely to enhance their properties and reduce the costs of production. A growing second-hand clothing market, especially in developing countries, has displaced (and is likely to further displace) potential demand growth for new garments in these markets. Therefore, consumption growth is unlikely to exceed the projected population growth of 1.2 percent. Prices, on the other hand, while they are expected to recover from the record lows experienced during the 2001 and 2002, are unlikely to reach the highs of the 1970s (or even the mid-1990s). Given modest consumption growth and poor price prospects, reducing the costs of production is an imperative for the cotton-dependent developing countries in order for them to increase (or at least sustain) their share in global cotton demand. On many occasions, that would entail further policy reforms.

Undoubtedly, the price prospects (and consequently the export shares of low cost producers, including many African countries) can be improved considerably if support by developed countries is reduced substantially or eliminated altogether. However, given the low probability of outright elimination of support, a second best alternative would be for support to be given in a non-distortionary manner. A type of support with minimal distortionary effects—the so-called decoupled support mechanisms—has re-gained popularity recently. Income transfers under decoupled support are based on past production levels and prices and thus have minimal impact on current production decisions—at least in theory. What makes decoupled support in the cotton sector an interesting (and potentially applicable) alternative is that almost all support is in the form of domestic measures. Therefore, changing the nature of support does not require changing the sources of funding such support as it would in the case of border measures.

Decoupled support was attempted in the European Union with the Common Agricultural Policy reform of 1992, in Mexico with the PROCAMPO program of 1994, and in the United States with the Freedom to Farm Act of 1996. The outcome of these programs has not been encouraging because these schemes did not include three essential elements that would make them successful: (i) substituting all existing support mechanisms with decoupled support; (ii) limiting the duration of the programs which would have made them true transition mechanisms and (iii) not requiring that land remain in agricultural use which would reduce the overall supply of the commodities under consideration and

hence lift world prices. Unless these conditions are met, any attempts to restore the credibility of decoupled support policies and ultimately remove support to the cotton (and other) sector(s) are unlikely to have the intended beneficial impact.

ACRONYMS AND ABBREVIATIONS

ADF	Augmented Dickey-Fuller (unit root test)
AFD	Agence Française de Développement
AGOA	Africa Growth and Opportunity Act
ATC	Agreement on Textiles and Clothing
CAP	Common Agricultural Policy
CEMAC	Communauté Economique et Monétaire de l'Afrique Centrale
CFA	Communauté Financière Africaine
CFDT	Compagnie Française de Développement des Fibres Textiles
COMTRADE	Commodity Trade Statistics
EU	European Union
FAO	Food and Agriculture Organization
FAPRI	Food and Agriculture Policy Research Institute
GATT	General Agreement on Tariffs and Trade
GDP	Gross Domestic Product
GM	Genetically Modified
HS	Harmonized System
ICAC	International Cotton Advisory Committee
IFCP	International Forum for Cotton promotion
IRSFC	International Rayon and Synthetic Fibres Committee
MFA	Multifibre Arrangement
MUV	Manufactures (export) Unit Value
OLS	Ordinary Least Squares
PP	Phillips-Perron (unit root test)
PROCAMPO	Programa Nacional de Modernizacion del Campo
SITC	Standard International Trade Classification
STO	State Trading Enterprise
TRQ	Tariff Rate Quota
UEMOA	Union Economique et Monétaire Ouest-Africaine
UKP	UzKhlopkoprom/UzPakhtasanoitish
USDA	United States Department of Agriculture
WTO	World Trade Organization

PART I: THE MARKET SETTING

THE FIBER MARKET

Fibers include a wide variety of products which can be divided into two broad categories: natural and man-made (see figure 1).[1] Natural fibers can be further divided into fibers of plant-origin (such as cotton and linen) and fibers of animal-origin (such as wool and silk). Likewise, man-made fibers can be further divided into inorganic and organic fibers. Inorganic fibers are materials such as ceramic, glass, and carbon (typically not used in garments.) Organic man-made fibers, on the other hand, are mostly used in garment production either as substitutes or as complements to natural fibers. Organic fibers are further sub-divided into natural and synthetic polymers. Natural polymers (often called cellulosic) are made from pulp (i.e. wood). The most common natural polymer is viscose, also known as rayon. The synthetic polymers are made from crude oil. The most common synthetic polymers are polyester, acrylic, and polyamide (also known as nylon). It is interesting to note the continuum of fibers in terms of their level of chemical transformation of the raw material. At one end of the spectrum are the natural fibers with minimal chemical transformation. In the middle are natural polymers with some degree of chemical transformation. At the other end of the spectrum are synthetic polymers with substantial degree of chemical transformation.

Cotton—by far the most common natural fiber of the 19th and 20th centuries—has been used as a raw material for clothing for at least 5,000 years. Its use expanded significantly after the invention of the ginnery in 1793 (which introduced mechanical separation of seed and lint consequently reducing the costs of producing cotton lint) and the industrial revolution which reduced the cost of producing textiles.

Although commercial production of man-made fibers on a large scale is a post-WWII phenomenon, experimentation was taking place as early as the late 1800s. Man-made fibers first appeared in the market earlier in the 20th century. In 1925, for example, rayon accounted for 1.6 percent of the world's total fiber consumption. Its share increased to 11.8 percent 20 years later.[2] Global production of cotton and chemical fibers reached 20 and 30 million tons, respectively, in 2000. The dominant chemical fiber producer is China accounting for 6.7 million tons, followed by the European Union, the US, and Taiwan with 3.4, 3.3, and 3.2 million tons, respectively.

Between 1960 and 2002, man-made fiber consumption increased at an annual rate of 4.7 percent. Cotton consumption during this period increased only 1.8 percent. Per capita chemical fiber consumption in 1960 and 2000 was 1.75 and 4.52 kilograms, respectively. The share of man-made fiber consumption is currently 57 percent, up from 22 percent in 1960; cotton's share fell to 40 percent in 2002 (see figure 2).

Prices of non-cellulosic man-made fibers have typically traded at comparable levels with cotton since the early 1970s. Between 1960 and 1972, the polyester price indicator de-

clined form $12 per kilogram to $2.50 per kilogram, mainly a reflection of the technological improvements (and consequently cost reductions) that took place in the chemical fiber industry. After reaching parity with the A Index in 1972, the ratio of polyester to A Index has increased at an average rate of 1 percent per year, implying that while cotton and polyester are priced at similar levels, polyester has made small pricing gains (see figure 3).

THE GLOBAL COTTON BALANCE

Production, Consumption, and Stocks

Cotton is produced in many countries but the northern hemisphere accounts for 90 percent of global output and more than two thirds of cotton is produced by developing countries. During the last 4 decades cotton production grew at an annual average rate of 1.8 percent to reach 20 million tons in 2001 from 10.2 million tons in 1960. Most of this growth came from China and India which tripled and doubled their production, respectively, during this 40-year period. Other countries which significantly increased their share of cotton production were Turkey, Greece, and Pakistan. Some "new entrants" also contributed to this growth. Australia, for example, produced only 2,000 tons of cotton in 1960 while it averaged 650,000 tons during the late 1990s. Francophone Africa produced less than 100,000 tons in the 1960s and now produces almost one million tons. The United States and the Central Asia Republics (then the Soviet Union), the two dominant cotton producers during the 1960s, have maintained their output levels at about 3.5 and 1.5 million tons respectively, thereby halving their shares. A number of central America countries which used to produce almost 250,000 tons of cotton, now produce virtually none. The share of East African cotton producers has declined considerably during this period. The concentration of production has been declining since its 1984 peak, when China became an important player in the cotton market, mainly reflecting increased production by the new entrants (see appendix A for definition and calculation of concentration).

During the 1990s, cotton production fluctuated between 18 and 20 million tons with no significant trend. China and the United States each accounted for approximately 20 percent of world output, followed by India (12 percent), Pakistan (8 percent), and Uzbekistan (5 percent). Other significant cotton producers are the countries of Francophone Africa, Turkey, Brazil, Australia, and Greece which account for a combined 18 percent of global output. The remaining share is accounted for by a number of smaller producers.

The consumption pattern of cotton is primarily determined by the size of the textile industries of the dominant cotton consumers. China, the leading textile producer, absorbed more than one quarter of global cotton output during the late 1990s. Other major textile producers (and hence major cotton consumers) are India, the United States, and Turkey, which together (including China) account for three-quarters of global cotton consumption. A number of East Asian countries have emerged recently as important cotton consumers. For example, Indonesia, Thailand, Korea, and Taiwan consumed only 130 thousand tons in 1960 (1.2 percent of global consumption) while they consumed 1.5 mil-

lion tons in 2002 (7.2 percent of global consumption). That is also reflected in the concentration pattern of consumption which increased by 2 percentage points during the 1990s.

Growth in the demand for cotton has been slow. Between 1960 and 2000, cotton demand has grown at the same rate as population (1.8 percent per annum) implying that per capita cotton consumption has remained stagnant. A contrasting view of total and per capita cotton consumption is vividly illustrated in figures 4 and 5.

Stocks, which have historically fluctuated between 20 and 50 percent of global output, have affected the cotton market considerably, especially price variability. Major stockholders are the United States and China. Consequently, the stockholding policies of these two countries have affected the level and volatility of cotton prices. Two major cotton de-stocking episodes are associated with periods of considerable price variability: the 1985 shift in US policy from stockholding to price support and the 1999 reforms in China.

Trade

One-third of cotton production is traded internationally. The four dominant exporters—US, Uzbekistan, Francophone Africa, and Australia—account for more than two-thirds of the world's exports. Four major producers, China, India, Pakistan, and Turkey do not export cotton and occasionally import to supply their textile industries. Imports of cotton are more uniformly distributed than exports.

During the 2000/01 season, the eight largest importers (Indonesia, India, Mexico, Thailand, Turkey, Russia, Italy, Korea) accounted for over half of world cotton imports. Apart from Russia, which prior to 1990 was considered a major producer but not an importer because the Central Asian cotton production was considered internal trade, most of the remaining cotton importers are new in the sense that have been importing cotton to supply their newly-developed textile industries. For example, four East Asian textile producers (Indonesia, Thailand, Taiwan (China), and Korea) accounted for less than 3 percent of world cotton imports in 1960, compared to 22 percent in 2002.

The import concentration index fluctuated around 5 percent during the late 1990s versus an export concentration of 10 percent. The corresponding indices during the 1960s were 7 and 12 percent, respectively, indicating that cotton trade is less concentrated than before despite the fact that trade as a percent of global output has not changed appreciably during this period.

In terms of direction of trade flows, 44 percent of cotton exports went from industrial to developing countries during 2000/01. The shares for 1980/81 and 1990/91 were 38 and 31 percent. The shares of cotton exports from developing to developing countries increased from 13 percent in 1980/81 to 31 percent in 2000/01. This change in the pattern of trade flows reflects the growth of the textile industries in South-East Asia.

Costs of Production

The International Cotton Advisory Committee collects data comparing costs of production

among cotton producers. In its most recent (2001) survey, based on a questionnaire of 28 cotton producing countries, it suggests that West Africa (especially Benin, Mali, and Burkina Faso), Uganda, and Tanzania, are among the lowest cost cotton producers. High cost producers are the United States, Israel, and Syria. The two European cotton producers, Greece and Spain, are probably the world's highest cost cotton producers although they did not participate in the survey.

Calculating and comparing the costs of producing cotton in various countries is, admittedly, a difficult task as it would involve a number of assumptions about the cost of land and capital as well as various hidden subsidies and distortions. As the publication warns, "The data must be used carefully. Differences in production practices, variations in the input supply among countries and direct and indirect technical and financial support to farmers in the form of free seed, technical advise, etc. makes comparisons difficult among countries." (p. 5).

The Long Term Outlook

The average population growth for the current decade is projected at 1.2 percent per annum. In the absence of any policy reforms by major players ICAC (2003) projects that consumption during the current decade is expected to be about 1.8 percent per annum, implying that by 2010 world cotton consumption will be 23.6 million tons. However, that may be viewed as an optimistic scenario considering that during the last 15 years cotton consumption grew by an annual rate of 0.7 percent.

PRICE TRENDS AND VARIABILITY

Real cotton prices have followed a declining pattern albeit subject to temporary spikes and troughs, a pattern that has been consistent throughout the last two centuries.[3] The reasons for the long-term decline of cotton prices are similar to those characterizing the price declines in most primary commodities, namely, reduction in the costs of production due to technological improvements, slow demand growth, and strong competition from chemical fibers. The declining pattern of cotton prices has not been smooth and it appears that a structural break has taken place in the mid-1980s (see figure 6). Between 1960 and 1984 real cotton prices averaged $2.62 per kilogram. Following a sharp decline in 1984 (from $2.45 per kilogram in 1984 to $1.83 in 1985 and $1.27 in 1986), they have been fluctuating around an average of $1.49/kg in the post-1985 period. There has been a declining trend of about 0.9 percent per annum between 1985 and 2002 (as opposed to only 0.2 percent during 1960-84).[4]

Reductions in the costs of production have been primarily associated with yield increases which during the last 40 years have doubled, from 300 kilograms per hectare in the early 1960s to 600 kilograms per hectare in the late 1990s. The phenomenal yield growth was aided primarily by the introduction of improved cotton varieties, expansion of irrigation, use of chemicals and fertilizers, and mechanical harvesting.[5] To these improvements

one should add developments in genetically modified seed technology and precision farming during the late-1990s, which are expected to further reduce the costs of production. Other innovations in the transportation and the information technology sectors have reduced costs of transporting cotton and also reduced the need for large stockholding. Substantial technological improvements have also taken place in the textile sectors whereby the same quality of fabric can be achieved with much lower quality of cotton, a trend that holds for many products whose main input is a primary commodity.

The principal reason behind the 1984/85 decline in cotton prices was the structural shift of the support policy by the United States and the shift in China's trade policy (McDonald 1997). During the 1950s, the US Commodity Credit Corporation bought and sold most of the US cotton. For example, between 1962 and 1966, the Credit Corporation accounted for almost two-thirds of cotton carry-over. While its role was reduced after 1970, the US would still account for 35 percent of non-Chinese stocks. Following the 1985 Farm Bill, the loan rates (i.e. the equivalent of a minimum prices) were substantially reduced and most of the US stocks were released and found their way into the world market. This year also marked the initiation of large exports by China, which for the previous 20 years was a net importer. In fact between 1980 and 1985, China went from the world's largest importer to the world's largest exporter.[6]

During the 1990s, nominal cotton prices, as measured by the Cotlook A Index, fluctuated between $2.53 per kilogram (May 1995) and $0.97 per kilogram (December 1999). The post-1996 decline in cotton prices was a result of a number of factors: first, there was excess production during the 1997/98 season. Second, demand was weak, especially from the East Asian textile producers affected by the financial crisis of 1997—Indonesia, Republic of Korea, and Thailand. Together these countries account for more than 15 percent of cotton import demand. Third, stocks rose to a record 9.8 million tons in 1997/98, which pushed the stock-to-use ratio to 0.51, the highest ratio since 1985/86. Fourth, low synthetic fibers prices, which were a result of currency devaluations in several East Asian chemical fiber producers. Between January 1997 and January 1998 the South Korean polyester fiber indicator price declined from $1.66 to $0.79 per kilogram. The strength of the US dollar during that period also contributed to the price declines.

It appeared that cotton prices would have a sustained recovery when they reached $1.45 per kilogram in December 2000—up 45 percent from a year earlier (see figure 7). However, the recovery was short-lived since it mainly reflected the 1998/99 weather-related short-fall in the US crop. In the 1998/99 season, US cotton output was a little over 3 million tons compared to an average of 4 million tons in the preceding 5-year period. With production and consumption for the 2001/02 season at 21.1 and 19.9 million tons, implying a surplus of 1.2 million tons, cotton prices have been under intense pressure. The A Index declined to $0.82 per kilogram in October 2001, which, excluding August 1986, is the lowest since November 1972.

In addition to their declining pattern, cotton prices have been volatile. The nature of

volatility, however, has changed considerably during the last 40 years. A simple measure of volatility shows that during 1985-2002 volatility was 2.5 times higher compared with 1960-72, but half compared to the 1973-84 period (see Appendix C for calculation and comments on volatility). Note that 1973 reflects the commodity price boom while 1985 coincides with the US change in cotton policy regime and the subsequent disposal of large cotton stocks.

COTTON AND THE DEVELOPING COUNTRIES

Although cotton is insignificant on a global scale (it accounts for only 0.12 percent of total merchandise trade), it is an important cash crop to a number of developing countries at both farm and national level. For example, cotton accounted for between 30 and 44 percent for total merchandize exports in 5 West African cotton producing countries (Burkina Faso, Benin, Chad, Mali, Togo) during 1998-99. The corresponding figures for Uzbekistan, Tajikistan, and Turkmenistan was 32, 15, and 12 percent, respectively. Cotton's contribution to the GDP of these countries has been substantial, ranging between 3.6 percent (Turkmenistan) and 8.2 percent (Tajikistan). With the exception of Turkmenistan, the per capita annual GDP in these countries is well below $500. In most of these countries (especially in Africa) cotton is typically a smallholder crop, it is the main cash crop, it is grown in rainfed land and the use of purchased inputs such as chemicals and fertilizers is minimal.

According to FAO estimates, there were 100 million rural households involved in cotton production worldwide during 2001. In China, India, and Pakistan about 45, 10, and 7 million rural households, respectively were engaged in cotton production. The total number of rural households depending on cotton in major African producing countries, including Nigeria, Benin, Togo, Mali, and Zimbabwe totaled 6 million.

The high dependence on cotton in these countries has important poverty ramifications, especially when large price changes take place. In a study which focused on Benin, Minot and Daniels (2002) found that a 40 percent reduction in farmgate cotton prices—equivalent to the price decline that took place from December 2000 to May 2002—implied a 7 percent reduction in rural per capita income in the short run and 5-6 percent reduction in the long run. They also found that the incidence of poverty among cotton growers rose in the short run from 37 percent to 59 percent while the average incidence of rural poverty (i.e. including cotton growers and other farmers) rose from 40 percent to 48 percent.

In terms of policy interventions, the cotton sector in developing countries has been traditionally taxed either explicitly through export taxes or implicitly through oligopsonistic arrangements or exchange rate misalignments. The pattern, however, has changed somewhat during the 1990s as a number of cotton producers undertook reforms. However, several African and all Central Asian cotton producers still tax their cotton sectors.

NON-CONVENTIONAL COTTON PRODUCTION

Recent trends in growing cotton focus on cost reductions through less intensive use of in-

puts, especially chemicals. These include the use of genetically modified (GM) seed technology and organic methods of production. GM cotton has not faced the degree of opposition faced by GM food crops and this has allowed more rapid adoption. Organic cotton has been embraced enthusiastically by environmental activists, but not by consumers. Hence, while there is plenty of room for expanding GM cotton, the scope for expanding organic cotton appears to be limited.

Genetically Modified Cotton

Genetically modified (GM) cotton, a result of technological developments of the 1990s, has the potential of reducing the cost of production and hence increasing profitability of the early adopters of this technology.

There are two types of GM cotton: *Bt* cotton (first used in the US in 1996) and herbicide-tolerant cotton (it gained approval by the US Environmental Protection Agency in 1998). *Bt (Bacillus thuringiensis)* is a naturally occurring soil bacterium that has been used as a biological pesticide for many years. The gene that produces an insect toxin has been transferred from that bacterium into the cotton plants. In turn, the plants produce their own toxin and there is no need for the grower to apply certain pesticides. Herbicide-tolerant cotton is a cotton plant that has been genetically modified to resist a herbicide that would otherwise kill both weeds and the cotton plant. Consequently, the herbicide can be applied without exterminating the cotton plant.

In economic terms, GM-type cotton (as well as all other GM products) act as insurance against pests, insects, or weeds. The growers pay a premium for the resistant-seed (as they would when buying insurance). If the insect attacks the crop, the grower's benefit comes through the lower costs from not spraying. If the insect does not attack the crop growers simply lose their premium (i.e. the cost difference between conventional and GM cotton).

GM cotton was first grown in the United States in 1996.[7] A number of cotton producing countries have introduced GM cotton technology since then including China, India, and Mexico in the northern hemisphere and Argentina, Australia, and South Africa in the southern hemisphere. Other countries are in the process of approval or at the trial stage, including Israel, Pakistan, Turkey, Brazil, and Indonesia. Major producers that have not used or approved GM cotton (as of 2003) are the European Union, Central Asia, and Francophone Africa (except Burkina Faso, which is conducting trials).

It is estimated that about 22 percent of world cotton area is under GM varieties, up from 2 percent in 1996/97. The largest user of GM cotton is the United States, which during the 2003/04 season is estimated to have sown 70 percent of its cotton area with GM varieties. In Australia, about 44 percent of cotton area was sown to GM varieties in 2002/03 up from 40 percent in 2000/01. In China, which adopted the new technology at an experimental stage in 1996, more than 20 million hectares with GM varieties were planted in 2002, corresponding to over 20 percent of cotton area. In addition to the imported GM varieties,

China has developed its own 11 GM varieties. According to Carl et al. (2001), the major share of the benefits from growing *Bt* cotton in China went to farmers (most of whom are small-holders).[8] This is because the Chinese cotton varieties were developed using public funds. In contrast, most of the benefits associated with GM products in the other cotton producing countries go to biotech and seed companies.

If the conversion to GM cotton varieties continues at rates experienced during the last few years, in less than 5 years as much as half of world's cotton will be of GM origin. That is equivalent to 40 percent of cotton area.

Organic Cotton

The second trend, organic cotton, may be a small market niche to be exploited by developing countries. Most developing countries can be classified as "organic" cotton producers, without altering their production practices, because of their low reliance on chemicals and fertilizer. Organic cotton potential, however, appears to be limited. Organic cotton initiatives have taken place in many countries, including in Africa, but the scale is still insignificant compared to global production of conventional cotton. Myers and Stolton (1999) reported that in 1997, about 8,150 tons of certified organic cotton fiber was produced worldwide, of which, 2,600 tons was produced in the US, 1,175 in India, 1,800 in Turkey, 1,570 in Africa, and 845 in Latin America.

Significant expansion of organic cotton faces a number of difficulties on both the supply and demand side. On the supply side, the certification process (especially in African cotton producing countries where the majority of growers are smallholders) is costly to implement and monitor; thus any benefits to farmers through higher prices of selling organic cotton and less use of chemicals are likely to be as high as the certification costs. On the consumption side, demand for organic cotton is not as strong as is in other commodities such as coffee and tea. There are three reasons for this. First, there is a "distance" in the eyes of the consumer between the primary product (cotton) and the final product (cloth). Second, consumers of clothing (as opposed to consumers of, say, beverages) must pay attention to a host of factors before they make their purchasing decision. The decision involves brand, color, style, size, type of cotton (typically identified by origin, such Peruvian, Egyptian, Turkish cotton), content (e.g., 80% cotton, 20% polyester), and care instructions. Adding to that already congested list information on whether cotton is of organic origin is rather difficult. Note that this decision making process compares unfavorably with much simpler labeling for, say, coffee or tea where something like "Organically grown from Costa Rica" or "Organic of Kenya origin" is likely to suffice. Third, organic products are typically associated with health-related benefits that do not apply to non-food products such as cotton.

THE SECONDHAND CLOTHING MARKET

One development that reportedly has affected textile production (and hence cotton con-

sumption) patterns in many developing countries during the last two decades is the dramatic increase in the trade of secondhand clothing. Estimates of the level of secondhand clothing trade are not accurate, however, COMTRADE statistics—the only comprehensive data source—show that secondhand clothing trade grew from $0.4 billion to $1.4 billion between 1980 and 2000. More than half of this trade takes place from industrial to developing countries, with the United States and Germany accounting more than $300 million (see table F7, Appendix F). While the level of trade may seem small in value terms, it is large in quantity terms. For example, consider that a typical T-shirt which would be sold for more than $10 in the US or Europe it is sold for only $0.50 in Africa.

The secondhand clothing trade typically originates through donations from the public to charitable organizations such as the Salvation Army and Goodwill Industries in the US, or Oxfam and Humana in Europe. Following collection, these organizations market the cloths through normal commercial channels. Sometimes they let other companies use their name, subject to a fee. The secondhand clothing industry has a number of unique characteristics. Hansen (2000, p. 122), for example, summarized it as follows:

> *The secondhand clothing trade is an unusual industry. Few other industries obtain their raw materials free, as do the charitable organizations, or have suppliers, the clothing donating public, who do not know the important role they play at the start of a long commodity chain. Indeed, the clothing-donating public is generally not aware of either the grant scale on which the charitable organizations commonly dispose of clothing to commercial middlemen or contract out the right to solicit and sell under their name.*

There are numerous (mostly supply-driven) factors behind the growth of the of secondhand clothing trade:

- **Wealth**. Consumers in high-income countries respond to changes in fashion quickly, hence increasing the availability of (seemingly unused) clothing.
- **Tax incentives**. When taxpayers donate to charities they often claim such donations on their tax returns, thus reducing their tax liabilities.
- **Lack of Information.** Because the public is often unaware that donations go through normal marketing channels, it probably donates more clothing that it would in the presence of full information disclosure.
- **Technological improvements**. Technological advancements during the last two decades have improved considerably the quality of garments thus increasing the durability of clothing far beyond what most consumers would consider as "normal use period."
- **Environmental sensitivities**. Because of sensitivity with environmental issues, consumers often prefer to recycle rather than dispose, even when the opportunity cost of recycling is not zero.
- **Policy reforms**. Liberalization of the textile industries in many low-income countries reduced the competitiveness of the locally produced clothing thus increasing the mar-

ket share of imported secondhand clothing.

The growth of secondhand clothing trade has a number of important welfare implications. First, consumers in developing countries gain because they have access to cheaper clothing. Second, the supply chain industry, such as importers, traders, and merchants of secondhand clothing gain. Third, the domestic textile industries of the countries that import secondhand clothing lose.

Opinions on these welfare implications differ. Some argue that secondhand clothing is dumping and should be subjected to prohibitive tariffs. Others believe that it is just another well-functioning sector albeit subject to minor trade distortions. Indeed, the tax credit adds an incentive to donate, thus it may be viewed as an export subsidy. Furthermore, the quantity and quality of information that the public receives when asked to donate clothing may be considered implicit subsidy—had they known that clothing goes through normal marketing channels, at least some would have chosen not to donate. Apart from these two factors, however, all other aspects of the secondhand clothing industry appear to be subject to normal demand and supply conditions. At the outset, the question is a quantitative one. If, in the absence of the tax incentive and the presence of full information disclosure, people would still donate the same (or similar) amounts of clothing, then the subsidy (and, *a fortiori*, dumping) issue does not deserve merit.

Because cotton is traded internationally with no significant border distortions (apart from the provisions of the Agreement of Textiles and Clothing), the location of the production and consumption of clothing should not matter. Thus, the only way that global cotton consumption can be affected by secondhand clothing trade is if the removal of the tax incentive along with proper dissemination of information reduces the availability of secondhand clothing considerably (i.e. secondhand clothing are destroyed).

PART II: THE POLICY SETTING

DISTORTIONS IN THE COTTON MARKET

Cotton has been subject to various marketing and trade interventions. Townsend and Guitchounts (1994) estimated that in the early 1990s, more than two-thirds of cotton was produced in countries which had some type of government intervention, including taxation and subsidization policies—cotton producing countries with little or no government intervention included: Argentina, Australia, El Salvador, Guatemala, Israel, Nicaragua, Nigeria, Paraguay, Peru, and Venezuela.

Interventions, whether taxes or supports/subsidies, have occurred (and in most cases still occur) through domestic market activities by state enterprises, price supports, and import duties or quotas. These activities result in the following broad (though not always distinct) types of distortions:

- *Taxation through a state marketing monopsony*. To transfer resources from cotton producers to the government, the state marketing agency pays fixed, below-world prices for cotton. This kind of intervention has been common in Central Asia, where the state handles both domestic marketing and international trade. In most of Francophone Africa domestic enterprises, along with a French state enterprise, control cotton marketing and trade.
- *Taxation through border interventions.* Typically to protect the domestic textile industries, the government uses border interventions to tax cotton producers. Egypt, India, Pakistan, and Turkey have occasionally exercised interventions of this nature.
- *Support to producers through price interventions.* To increase producers' income, cotton producers in the European Union receive support under the Common Agricultural Policy, amounting to twice the world price in some years, while U.S. cotton producers receive generous support. This type of intervention accounts for the greatest part of distortions in the global cotton market.
- *Support through border interventions.* To increase producers' income some countries, such as China, impose import tariffs on cotton.
- *Support through input subsidies.* In addition to output distortions, several distortions in input markets have affected the cotton sector, most notably subsidies on credit, fertilizer, and irrigation.

The International Cotton Advisory Committee (2002 and 2003), which has been monitoring the level of assistance to cotton production by major producers since 1997/98, found that eight countries provided direct support to cotton production—US, China, Greece, Spain, Turkey, Brazil, Mexico, Egypt. The level of direct production assistance in the five seasons between 1997/98 and 2001/02 ranged between $3.8 and $5.3 billion. For 2001/02, direct assistance to US cotton producers reached $2.3 billion, China's support totaled $1.2 billion, and support was $0.8 billion in the EU (Greece and Spain). Producers in

Turkey Brazil, Mexico, and Egypt received a combined total of $150 million in support. India also supported its cotton sector during the 2001/02 season by an estimated $0.5 billion.

In addition to domestic support, there are some border restrictions, mainly in the form of import tariffs. Most countries that impose import quotas are cotton exporters, some with large textiles sectors. Import tariffs rates for 2003 were: Argentina (7.5 percent); Brazil (7.5 to 10 percent); China (3 percent within quota, 90 percent outside quota; TRQ for 2003 was 856,250 tons, likely to be exhausted); Egypt (5 percent); India (10 percent); US (4.4 cents/kg within quota and 31.4 cents/kg outside quota; TRQ for 2002 was 73,207 tons while cotton imports totaled 6,295 tons); Uzbekistan (10 percent); Zimbabwe (15 percent duty plus 5 percent import tax).

The remaining of this section analyzes the structure and degree of domestic interventions in the US, EU, and China. It also looks at Uzbekistan, a country which taxes its cotton sector.

The United States

Numerous commodity programs (including cotton) exist in the United States with the ultimate outcome of transferring resources from consumers and taxpayers to producers. The objectives of these programs have evolved around two themes: raising and/or stabilizing farm income and preserving the small farm. A partial list of these programs includes price and income support, trade restrictions such as import quotas and tariffs, publicly funded research, publicly funded irrigation, export subsidies, export credit guarantees, subsidized land set-aside and conservation schemes, and subsidized crop insurance. The budgetary outlays for most of these programs are authorized by the Congress (and subsequently approved by the President) every few years through various *Acts*, commonly known as *Farm Bills*. There have been numerous *Acts* since the enactment of the first one in 1929, including a 1934 Supreme Court decision which declared unconstitutional the main provisions of the *1933 Agricultural Adjustment Act*.

Historically, the cotton sector in the United States has received proportionally more support than most other commodities. Al least 20 *Acts* since 1929 included provisions that affected the cotton market in one way or another. The most important shift in support during the last two decades was the *1985 Farm Bill*, which replaced public stock-holding management by a price support mechanism known as deficiency payments. A second important change came with the *1996 Farm Bill* whereby deficiency payments were replaced by decoupled payments.

Currently, the main channels of support are de-coupled payments (formerly known as production flexibility contracts), deficiency payments (through the loan rate mechanism), insurance, subsidies to domestic mills (the so-called Step-2 mechanism also referred to as export subsidy), and emergency payments (introduced in 1998 to compensate for the loss of income due to low commodity prices but became "permanent" under the *2002 Farm Bill*).[9] Direct payments are predetermined annual payments based on historical enrolled

areas of cotton and were introduced with the *1996 Farm Bill* in order to compensate for the "losses" due to the elimination of deficiency payments. Market price payments, which consist of loan deficiency payments, marketing loan gains, and forfeitures, are designed to compensate cotton growers from the difference between the world price and the loan rate (i.e. target price) when the latter exceeds the former. Export subsidies, or Step-2 market payments, are made to eligible cotton exporters and domestic end users of cotton when domestic US prices exceed North Europe c.i.f prices by a certain level and the world price is within a certain level of the base loan rate. The objective of the Step-2 payment is to bridge the gap between higher US domestic prices and world prices so that US exporters and mills maintain their competitiveness.

According to the International Cotton Advisory Committee, between 1997/98 and 2002/2003, the direct support to cotton production averaged $1.7 billion (see table 2). That figure, however, does not include support through insurance, emergency measures, and the step-2 mechanism. When all these measures are taken into consideration, support to the US cotton growers is much higher (table 2). During the 1996/97 season—the first year of the *1996 Farm Bill*—support to US cotton growers amounted $878 million, almost $700 million from production flexibility contract payments and the rest from insurance subsidy. In 1997/98 the support was $1.2 billion. When prices begun declining, the emergency assistance measures were introduced, increasing the support to $1.9 billion in 1998/99, $3.5 billion in 1999/2000, $2.2 billion in 2000/01 and $3.6 billion during the last season.

In 2002 the US passed the *2002 Farm Bill*, which is expected to be in place for the next six years. This Bill retained the earlier support through various Loans, Flexibility Contracts, and Insurance, as well as the Step-2 payment while it legitimized the emergency assistance under the term counter-cyclical payments. If cotton prices remain at their 2001/02 levels, then US support to its cotton sector is expected to be on the order of $3.5 to $4.0 billion for the next six years, implying the US cotton producers will be receiving close to twice the world market price.

The European Union

The origin of cotton intervention in the European Union goes back to the early 1980s when Greece and Spain, the two European cotton producers, joined the Union's Common Agricultural Policy. During the 1960s, there were three cotton producers in Europe: Greece and Spain which produced an average of 85,000 tons each and Bulgaria which produced 25,000 tons. Throughout the 1970s, Bulgaria's output declined while Greece and Spain managed to retain their cotton production at the levels experienced during the 1960s. Cotton production by the three countries taken together, experienced an annual decline of 0.4 per annum between 1960 and 1982. With the EU's expansion and the subsequent accession of Greece and Spain, cotton production grew by an annual average of 7.3 percent. During the 1990s, Greece's and Spain's cotton output averaged 325,000 and 78,000 tons, respectively (see figure 8).

Under the Common Agricultural Policy, support is given to cotton growers based on the difference between the market price and a guide (i.e. support) price. Advance payments, which are made to ginners who pass the subsidy to growers in the form of higher prices, are on estimates of seed cotton production. The policy also influences the quantity of cotton produced by a maximum guaranteed quantity of seed cotton for which assistance is provided—782,000 tons of seed cotton for Greece and 249,000 for Spain, approximately equivalent to 255,000 and 82,000 tons of cotton lint.

The European Union reformed its cotton program in 1999 (European Commission 2000). While the guide price level and the maximum guaranteed quantity of seed cotton for which assistance is provided have been maintained, "penalties" (i.e. reduction in subsidy) for excess production over the maximum guaranteed quantity increased. Under the reformed policy, for each 1 percent of excess production, the level of subsidy is lowered by 0.6 percent of the guide price as opposed to 0.5 percent prior to 1999. As production increase, the "penalty" becomes stiffer, effectively, putting an upper limit on the budgetary outlays to the cotton sector. It is important to note that this quantitative restriction (the so-called maximum quantity guaranteed) applies at the aggregate (i.e. country) level implying that when this restriction is converted to individual basis, it creates not only administrative complexities but also leads to misallocation of resources. Karagiannis and Pantzios (2002) found that the current system failed as a surplus containment mechanism and also resulted in farm income losses.

Between 1995/96 and 1999/2000 the budgetary expenditure on cotton aid ranged between €740 and €903 million, implying that, on average, EU cotton producers received more than twice the A Index—the world price of cotton. Note that even in periods of high prices, EU cotton producers receive support since the amount allocated to the cotton sector must be disbursed. In addition to output subsidies EU cotton producers receive subsidies on inputs such as credit for machinery purchase, insurance, and publicly financed irrigation.

China

China is currently the largest producers, consumer, and stockholder of cotton. China's cotton sector became fully government-controlled in 1953 after the introduction of the first Five-Year Plan (Zhong and Fang 2003). The central planning policies adopted then were similar to those of the Soviet Union and remained in place for the next 35 years. The central government set production targets and procurement quotas. This monopoly was easily exercised because all ginning facilities were owned by the Cooperatives. A step to boost cotton production was taken in 1978 by increasing the price of cotton as well as supplying more fertilizer. A second boost came in 1980 with the partial abolition of the communal production system under the Household Responsibility System which gave land use rights to individual farmers. The Chinese cotton sector consists of primarily smallholders with plots ranging between 0.5 and 1 hectares.

Evidence suggests that the government of China protects its cotton sector through support prices, import tariffs, export subsidies, and public stockholding. The government sets a reference price for cotton, typically above world prices. China also maintains tariffs on imports that bridge the gap between domestic and world prices. Following its WTO accession arrangements the tariffs will be reduced to 15 percent but at the same time a tariff-related quota system will be implemented to manage imports.

The International Cotton Advisory Committee found that support to the cotton sector in the six seasons beginning in 1997/98 ranged from $0.8 to $2.6 billion. Huang, Rozelle, and Chang (2003) estimated that during 2001 the nominal rate of protection for cotton averaged 17 percent. Fang and Beghin (2003), however, estimated that between 1997 and 2000, the nominal protection coefficient for cotton has averaged 0.80, implying that China taxes its cotton sector by 20 percent. The different views on the nature and degree of intervention, however, should not be surprising given the complexities of China's agricultural policies as well as the unreliability of the data.[10] However, one may conclude that China subsidizes its cotton sector as indicated by Jinglin (2003, p. 99):

> *In order to assure the interests of the farmers and to promote their stable incomes, China is actively exploring the direct subsidy system for the bulk of agricultural products such as grain and cotton, and having the existing indirect subsidies adjusted to become direct subsidies and changing the subsidies meant to meant previously for the distribution enterprises to the subsidies directly for the farmers. Nevertheless, such subsidy method and standard will not surpass the framework of the WTO rules.*

In September 1999, the government of China announced reform measures which included: (i) the creation of a cotton exchange to facilitate domestic spot trading; (ii) the reduction of prices paid to producers; and (iii) a reduction in stocks. In some sense the reforms have worked: China's stocks declined from 4.1 million tons in 1998/99 to 2.3 million tons in 2000/01.[11] In September 2001 further reforms were announced and are currently under way (Zhong and Fang 2003). First, the internal cotton market would be open to cross-regional trade. Second, various enterprises would be allowed to buy cotton directly from producers with approval granted by the provincial government. Third, ginning operations would be separated from marketing cooperatives in effect making them commercial enterprises.

Uzbekistan

Uzbekistan, the world's fifth largest cotton producer and second largest cotton exporter, produces more than one million tons of lint, most of which is exported. During 1998-99 cotton exports accounted for one third of total merchandize exports while the sector contributed an average of 6.4 percent to the country's GDP. Prior to 1991 all aspects of Uzbekistan's cotton sector were under state control (of the Soviet Union). Most cotton was either consumed by mills in Russia (then considered domestic trade) or shipped to Eastern European countries under barter arrangements. Following the collapse of the Soviet Un-

ion, Uzbekistan begun exporting its cotton to Western countries in exchange of foreign currency (until 1996 some cotton still went to Russia in barter trade terms).

Although 12 years have passed since the change in the trade regime, most aspects of production, marketing, and trade of the sector closely resemble pre-1991 arrangements. There are numerous entities involved in all post-production activities of cotton. The three most important ones are: (i) the state company handling ginning; (ii) the State Trading Organizations handling exports; and (iii) the Ministry of Foreign and Economic Relations handling financial transactions.

All pre- and post-ginning operations of cotton are handled by UzKhlopkoprom/ UzPakhtasanoitish (UKP), a state company which used to be a ministry. UKP is responsible for collecting, storing, ginning, and classifying cotton, making payments to growers, and providing inputs. UKP owns considerable assets, including all ginning and storage facilities as well as handling machinery and equipment.

The second important entities are the three state trading organizations (STOs) in charge of handling all aspects of cotton exports. The main responsibilities of these organizations include contracting cotton merchants for the sale of cotton, organizing the availability and shipment of cotton, receiving payments and converting them into local currency, and paying UKP. Although these organizations have a number of other responsibilities (e.g. purchasing machinery and equipment on behalf of the government) exporting cotton is their core activity. Because each organization has been allocated a quota of cotton to be exported, there is no competition involved in the export process.

The third important entity is the Ministry of Foreign Economic Relations which reports directly to the government. Its main function is to manage cotton export operations, including setting prices, selecting buyers, and monitoring dollar receipts. There are a number of other entities involved in the sector such as the state company responsible for domestic and international transportation of cotton, the organization responsible for quality monitoring, and the customs.

It appears that cotton growers are heavily taxed both directly through the lower price received by UKP (which, in turn, receives a fixed price by the STOs, as dictated by the Ministry) and indirectly through the exchange rate regime. A recent study found that at an ex-ginnery price of $1.03/kg, the STOs receive the equivalent of $0.63/kg (these calculations were based on an A Index of $1.24/kg). With respect to the difference between $1.03 and $0.63/kg, the study concluded: “It is not clear exactly where this profitability figure is allocated. It is alleged that, after a marketing fee is deducted, the balance is paid to the Ministry of Finance as an export duty.” The declared price to be paid to farmers by UKC is 126,000 Cym/ton of seed cotton, which, at an exchange rate of 960 Cym/$ and 32 percent ginning out-turn ratio implies a price of $0.41/kg, about one third of the A Index.

Perhaps, it is not unreasonable to conclude that, apart from the fact that cotton exports from Uzbekistan moved from a barter to a commercially oriented structure, the sector is still tightly controlled by the government. Moreover, growers are taxed heavily, re-

ceiving only about one third of the export price of cotton.

PREFERENTIAL ARRANGEMENTS AND THE COTTON MARKET

Unlike the markets for commodities such as cocoa, coffee, and rubber, there has been no United Nations-backed international price stabilization scheme or stockholding mechanism in the cotton market. The cotton market, however, may be indirectly affected by two arrangements: the Agreement on Textiles and Clothing and the US African Growth and Opportunity.

The Agreement on Textiles and Clothing

The Multifibre Arrangement (MFA) was an agreement among developed country importers and developing country exporters of textiles and apparel to regulate and restrict the flow of trade of textiles. Negotiated in 1973 under the auspices of General Agreement on Tariffs and Trade (GATT), the MFA replaced a number of bilateral textile agreements as a temporary exception to the rules that otherwise would apply. The MFA (and its predecessor agreements) influence the location of the textile industry thus increasing the costs of textile products—in addition to other welfare implications.

In 1995, the MFA was replaced by the Agreement on Textiles and Clothing (ATC). Under the ATC, import quotas in textiles will come to an end by January 1, 2005 and importing countries will no longer be able to discriminate between exporters. Their elimination is expected to encourage the relocation of textile processing facilities from developed to low cost (mostly developing) countries, reduce the cost of producing textiles, increase cotton demand, and consequently raise cotton prices.

The African Growth and Opportunity Act

The African Growth and Opportunity Act (AGOA) provides African countries with the most liberal access to the US market available to any country with which the United States does not have a free trade agreement and covers the 8-year period from October 01, 2000 to September 30, 2008.[12] One condition is that these countries must have undertaken substantial policy reforms. The *Act*, which was part of the US Trade Development Act of 2000, was signed by President Clinton on May 18, 2000 while President Bush signed amendments—known as AGOA II—into law on August 6, 2002, expanding the preferential access for imports from the eligible countries.

Although AGOA sets stringent conditions, it offers potentially vast benefits for qualifying African countries because it includes a broad list of commodities. However, one should note that AGOA is a two-part Act: one applying to non-textile/clothing sectors and one applying to the textile/clothing sectors. The conditions for the latter are much more stringent than the conditions for the former (AGOA 2002). Specifically:

> *The Act provides for duty-free and quota-free access to the U.S. market without limits for*

apparel made in eligible Sub-Saharan African countries from U.S. fabric, yarn, and thread. It also provides for substantial growth of duty-free and quota-free apparel imports made from fabric produced in beneficiary countries in Sub-Saharan Africa. Under AGOA I, apparel imports made with regional (African) fabric and yarn are subject to a cap of 1.5% of overall U.S. apparel imports, growing to 3.5% of overall imports over an 8 year period. AGOA II doubles the applicable percentages of the cap.

Beneficiary countries for apparel exports must establish an effective visa systems to ensure compliance with rules of origin, specifically to prevent illegal transshipment and use of counterfeit documentation, and show that they have instituted required enforcement and verification procedures.

Currently, the average duty to garment imports into the US is 17.5 percent. Under AGOA, apparel imports into the US from the 14 eligible African countries will be duty free subject to an upper limit of 3 percent of total US apparel imports. Since total trade in clothing from Africa to the US is very small, the 3 percent cap (to increase to 7 percent by year 7) is unlikely to become a binding constraint. Another beneficial provision is that for countries with Less Developed status, there is a 4-year exception to the rule of origin (it expires in 2004). For example under this provision Tanzania can import yarn from China and export cloth to the US.

IMPACT OF DISTORTIONS AND PROSPECTS OF REFORMS

Impact of Distortions

On the textile side, Martin (1996) estimated that the MFA imposes an implicit tax of about 20 percent on cotton products relative to synthetic fiber products. A more recent study by Quirke (2002) simulated the impacts of full implementation of ATC and found that the world price of cotton will increase by 4 percent (the equivalent of 4 cents/kg at 2001 world cotton prices), if the ATC is phased out as planned.

On the cotton side, the International Cotton Advisory Committee concluded that in the absence of direct subsidies, average cotton prices during the 2000/01 and 2001/02 seasons would have been 17 and 31 cents/pound higher. If the US alone removed its subsidies during these two seasons, world cotton prices would have been 6 and 11 cents higher, respectively. These figures imply cotton prices 30 and 71 percent higher than the actual averages of 57.2 and 41.8 cents/pound. The study, which is based on a short run partial equilibrium analysis, does acknowledge that while removal of subsidies would result in lower production in the countries which receive them (and hence higher prices in the short term), such impact would be partially offset by shifting production to non-subsidizing countries in the medium to longer terms; similarly higher prices are likely reduce the growth of cotton consumption making the long-run impact less striking.

Quirke (2002) estimated that removal of production and export subsidies by the US and the EU are likely to induce a 20 percent reduction in US cotton production, 50 percent

reduction in US cotton exports, with much higher figures for the EU. He also estimated that if support was not in place, world cotton prices would be 10.7 percent higher compared to their 2001/02 levels. Note that both the ICAC analysis and Quirke (2002) used the production and export support levels reported by ICAC (see Appendix F, table F11 for data details).

Based on a partial equilibrium model, Tokarick (2003) found that multilateral trade liberalization in all agricultural markets (including cotton) is expected to induce a 2.8 percent increase in the world prices of cotton, with 0.8 percent coming from the removal of market price support and the remaining 2 percent coming from the removal of production subsidies (removal of market price support most likely applies to the US Step-2 payment). Tokarick also calculated that global reforms will lead to $95 million in total change in welfare per annum.

FAPRI (2002) found that under global liberalization (i.e., removal of trade barriers and domestic support of all commodity sectors), the world cotton price would increase over the baseline scenario by an average of 12.7 percent over the 10-year period (see table 3). The largest gains in trade go to Africa which would increase its exports by an average of 12.6 percent. Exports from Uzbekistan and Australia increase by 6.0 and 2.7 percent, respectively while exports from the United States decline by 3.5 percent. The most dramatic impact is on the production side where the European Union's cotton output would decline by more than 70 percent. The latter outcome should be a complete surprise considering that the European Union's cotton output during the late 1990s was, on average, three times as much as it was before CAP took effect on the cotton sector.

Prospects of Reforms by Major Producers

Prospects for policy reforms by major producers subsidizing the sector are mixed. Support for cotton in the European Union is likely to remain at current levels. It is unlikely to increase for two reasons. First the countries expected to join the Union are not cotton producers and hence there will be no budgetary pressure. Second, the current support scheme is, effectively, subject to an upper limit which appears to be a binding constraint as both Greece and Spain, being among the world's highest-cost cotton producers, are unlikely to increase production given the reduced support they would receive if they exceed the current output levels. On the other hand, support is not expected to be eliminated because it supposedly goes to low income areas and hence it is regarded as a poverty reduction program. The nature of support, however, may change by shifting away from direct price support towards partially decoupled payments according to a recent EU proposal (see box 1). The conditions of success and implications of the shift to decoupled support are discussed in the last section of this paper.

The US took a step in the right direction with the replacement of the deficient payment system by decoupled payments in 1996 but all progress was eliminated with the *2002 Farm Bill* which effectively: (i) legitimized emergency payments introduced in 1998/99 fol-

lowing the sharp decline in prices; (ii) renamed them to counter-cyclical payments; (iii) increased target prices; and (iv) made it more convenient for larger farmers to increase the support they receive. Historically, US farm bills either give what they promise or give more than what they promise (as the recent experience showed). Hence, if history is any guide, it is reasonable to expect that US cotton farmers will be receiving generous support for the next 6 years, unless the support exceeds WTO commitments.

However, a number of factors may induce some early reforms. First, the substantial increase of the support to the US cotton sector along with 30-year record low prices and the fact that 10 percent of US cotton growers receive 90 percent of the support (hence falsifying the claim that support preserve the small farm), is likely to put pressure for altering the nature of policy sooner. Second, Brazil's request for consultations at the WTO regarding US cotton subsidies may create some pressure to lower subsidies (WTO 2002). Third, four West African cotton producing countries (Benin, Burkina Faso, Chad, and Mali) pressed for removal of support to cotton sector through the WTO. In an unusual move, the President of Burkina Faso addressed the WTO on June 10, 2003, asking for financial compensation for cotton producing low income countries to offset the injury caused by support. This compensation, according to the request, should be in place for as long as subsidies are in place.

China appears to be the most promising case of reform. The reforms undertake in 1999 and more recently in 2001 indicate that its cotton sector will be soon exposed to internal and external competition. China is also in the process of establishing a cotton futures exchange, indicating that market forces within the sector are likely to play a more significant role in the future (Shuhua 2003).

On the international side, while the phase-out of the ATC is supposed to end the distortions imposed on the location of the textile industries, it is uncertain whether the expected benefits will be fully realized. First, ATC is back-loaded with most of the reforms expected to take place in the last year, thus increasing the risk of non-compliance. Second, a number of (mainly EU) countries have repeatedly sought to impose antidumping duties on textile imports from Asia in recent years. Third, there are a number of provisions under the ATC which allow for the imposition of temporary duties in the case that the currently domestic textiles suffer "significant damage" following the phase out.

REFORM INITIATIVES IN AFRICA

During the 1990s, a number of African cotton producing countries undertook substantial reforms. The reform process and its outcome have been studied extensively. See, for example, Kähkönen and Leathers (1997) for Zambia and Tanzania; Sabune (1996) and Lundbæk (2002) for Uganda; Larsen (2002) for Zimbabwe; Baffes (2002) for Uganda, Zimbabwe and Tanzania; Baffes (2000), Badiane et al. (2002), and Goreux and Macrae (2003) for Francophone Africa; Baffes (2002) and Gibbon (1998) for Tanzania. Poulton et al. (2003) looked at the cotton sectors of six African countries while Shepherd and Farolfi (1999) reviewed

export commodity sectors for a number of sub-Saharan African countries. The remainder of this section draws mainly from these studies and summarizes the reform experiences in the cotton sectors of Uganda, Zimbabwe, Tanzania, as well as the efforts currently under way in Francophone Africa.

Uganda

Cotton was introduced to Uganda early in the 20th century, and production grew rapidly until the mid-1930s, when coffee began to compete as an alternative cash crop. Cotton production continued to increase steadily, peaking during the early 1970 at 75,000 tons, making it the third largest African cotton producer after Sudan and Egypt. Most activities in the cotton industry were administered under monopolistic arrangements. The Ministry of Agriculture had responsibility for cotton research and seed multiplication. Responsibility for cotton seed for planting and oil milling fell to the Lint Marketing Board (a state enterprise), which was also responsible for lint marketing (both domestic and export) and for regulating the industry. Primary marketing and processing were the responsibility of cooperatives, which had their own society networks and ginning operations.

The political instability, poor governance, and inappropriate macroeconomic policies of the 1970s and 1980s had a devastating effect on the Ugandan economy and hit the cotton sector especially hard. Cotton production collapsed, plunging to a low of 2,000 tons in 1987. Seed multiplication activities were disrupted, as were research and extension. Cooperatives failed to pay farmers cash for their cotton, and inefficient ginning marketing and operations generated high overhead costs.

In 1992, with World Bank assistance, Uganda embarked on a major reform program that included the liberalization of the cotton industry (World Bank 1994). The government redefined its role in the cotton industry taking on some new responsibilities (especially during the transitional phase) and shedding others. Ginning and the marketing of cotton and cotton inputs were liberalized, and research, seed multiplication, and extension services were strengthened.

At the time of the reforms the cooperatives were crippled by bad debt. Potential ginning capacity was much greater than actual capacity, and run-down ginneries needed infusions of new capital. Management knew little about how to restructure their facilities, however. To address the problems, the government established the Business Advisory Service, a temporary agency that worked with cooperatives to draw up new business plans. In return for restructuring their businesses, the ginneries would receive limited debt relief. Temporary lines of credit were established through the Bank of Uganda's Development Finance Department to provide working capital for the restructured firms. Some cooperatives were able to sell assets and finance smaller, more efficient business. Others entered into joint ventures with foreign partners.

Government participation in the cotton sector after the reforms takes place almost entirely through the Cotton Development Organization. The Cotton Organization repre-

sents the cotton industry as a whole and to monitor the production and marketing of cotton. A 12-member board of directors which includes public and private sector representatives governs the organization. Among other things the board approves expenditures, senior staff appointments, procurement procedures, and business plans. An auditor-general reviews the Organizations' accounts and by law must report the findings to the legislature.

To carry out its mandate, the Cotton Organization can charge for its services, borrow, manage property, and levy a cess (local tax). The initiating statute also placed explicit limits on the Organization's authority, however. The agency cannot levy a cess of more than 2 percent, although the Ministry of Agriculture, which is responsible for the Organization, can vary or rescind the cess by statutory instrument. The types of penalties the Organization can levy for noncompliance are limited. Further, it is obliged to give all new entrants registration permits, even if they have not previously been engaged in the cotton industry. Businesses can renew their registrations automatically by paying the fees.

In many respects the cotton reforms in Uganda have been successful. During the eight-year period staring in 1995/96 cotton output in Uganda has averaged 17,000 tons, an almost three-fold increase compared to the eight seasons prior to 1995/96. The corresponding A Index average for before and after 1995/96 was $1.56 and $1.40 per kilogram. The farmers' share in world prices rose from less than 50 percent to 70 percent after the reforms while a number of new traders and exporters entered the sector. This success came despite the failure of most credit mechanisms that have been launched after the reforms.

Zimbabwe

Commercial production of cotton in Zimbabwe started in the early 1920s while a comprehensive cotton research program along with a research station was set up in 1925. Advanced technology through insect control and the development of improved seed varieties increased production turning Zimbabwe into an important cotton producer in Africa. Initially, cotton marketing was the responsibility of a committee under the Grain Marketing Board. The Cotton Marketing Board was established in 1969 and handled cotton marketing.

The Board controlled most aspects of cotton production until 1994, from the sale of planting seeds to the purchase of cotton from farmers. Ginning and the marketing of cotton and cotton seed fell under its purview. The Board had eight ginneries and was the sole buyer of cotton (the country's single private ginnery had to buy cotton from the Board on contract). The Board also regulated the industry. It announced producer prices well in advance, so that the state absorbed all of the price risk.

The Cotton Board grew into an inefficient organization with poor governance and high operating costs. It developed financial difficulties because of weak management and subsidized cotton sales—often at half the international price—to the domestic textile industry. Cotton production fell by almost half during the 1980s. Producers were not paid on time and often did not receive full payments. By the late 1980s it had become clear that the

board would have to be restructured or the cotton industry would collapse. A severe drought in 1991–92 contributed to the sector's woes, causing a further 60 percent decline in production.

Zimbabwe appointed private sector representatives to the Cotton Board in 1992, leaving just one government representative. The Board's mandate at the time was to develop a privatization plan for all aspects of cotton trade and marketing. Various regulatory controls (such as seed quality regulations and cotton grading) were transferred from the Board to the Ministry of Agriculture. In 1993 the government announced that the cotton market would be open to new entrants, bringing the Cotton Board's monopoly to an end. In 1994 all subsidies to the textile industry were discontinued.

In July 1994 the Cotton Board began having difficulty paying for cotton, and a number of commercial growers started to buy their seed cotton and have it ginned at the only private gin. In September 1994 the Board's monopoly was formally terminated, and it became the Cotton Company of Zimbabwe, with the government holding all shares. The government assumed all of the Cotton Company's debts, allowing the agency to start out with a clean balance sheet, and discontinued all subsidies to the textile industry.

Private companies have moved into ginning and marketing in the country. As of 1994 the Cotton Company still owned 80 percent of the ginning capacity in Zimbabwe and operated a network of buying centers and collection points throughout the major cotton-growing areas. The Commercial Cotton Growers Association, a cooperative owned by growers who farm 25 hectares or more, joined with an international cotton company to form a new firm, Cotpro, that provides competition for the Cotton Company

In 1995 the Cotton Company leased two of its gins to Cargill, a U.S.-based agribusiness. Cargill started buying seed cotton, putting itself in direct competition with the Cotton Company and Cotpro. In 1996 it bought the two gins it had been leasing from the Cotton Company. In October 1997 the Cotton Company was privatized. The government holds 25 percent of the shares, small-scale farmers 20 percent, institutional investors and the general public 15 percent each, large-scale farmers and the National Investment Trust 10 percent each, and employees 5 percent.

Following reforms the cotton industry improved in several ways. First, cotton production is up substantially. During the eight seasons since 1995/96, cotton output has averaged 115,000 tons, 50 percent higher than the eight-period average prior to 1995/96. Some 30 percent of the 1997/98 cotton harvest was marketed entirely by private entities. Private companies now transport most cotton. Competition has pushed the price farmers receive to close to 80 percent of international prices, and producers are being paid faster. Zimbabwe has also retained its premium it used to receive in the world market.

Despite its success, the cotton sector of Zimbabwe is currently going through major difficulties which are beyond the sector's control. Political and macroeconomic instability, and uncertainty over land issues has reduced substantially investment in the sector. The sector is also suffering from implicit taxation through inflation and exchange rate mis-

alignment. During 2002, for example, the official exchange rate was fixed at Z$45 per US$. However, unofficial reports indicated that it was traded as high as Z$400 in the parallel market.

Tanzania

Cotton was introduced to Tanzania around 1904 by German settlers as a plantation crop, but the attempt failed. During the 1920s new efforts focused on smallholder production, first in Eastern and later in Western Tanzania. Local research during the 1930s led to the development of a local pest-resistant variety. Cotton output, especially in Western Tanzania, rose considerably with the releases of these local varieties, along with better organization of the sector following establishment of the Tanganyika Lint and Seed Marketing Board in 1956. By 1966 Tanzania's cotton output was 80,000 tons, or 0.75 percent of world production of 10.7 million tons.

A turning point came in the 1960s following the spread of the cooperative movement and deterioration of relations between ginnery owners (mostly Asians) and cotton growers. Several hundred primary societies had sprung up, and the groups began handling crop purchasing. Soon, they formed cooperative unions and began building ginneries, training staff, and taking over ginneries and cotton oil mills from foreign owners. In an attempt to correct the inefficiencies and poor management, the government abolished the unions in 1976 and turned over cotton marketing to the Tanzanian Cotton Authority, the successor of the Lint and Seed Marketing Board. The government set the prices paid to farmers, establishing uniform national prices for an entire season. This marketing structure also failed, and the cooperative unions were reinstated between 1980 and 1984. The unions and primary societies acted as agents for the Tanzanian Cotton Marketing Board, the renamed Tanzania Cotton Authority. The primary societies stored and sold cotton to the cooperative unions for a fixed price, and the unions processed the seed cotton for a fixed margin. The Cotton Board managed domestic and international sales. Because the cooperative unions were semipublic entities, they simply added another bureaucratic layer rather than making a substantial contribution to value added. Most of the unions accumulated huge debts and managed to survive only through government subsidies and donor support.

The first steps toward cotton reform in Tanzania were taken in 1989/90, when the government launched the Agricultural Adjustment Program. The program transferred ownership of seed cotton from the Cotton Board to the cooperative unions, and the board was converted into a fee-based marketing service for final sales and input purchases. Price controls on cotton were gradually relaxed. In 1991/92 the government announced only indicative prices, not fixed prices. The cooperative unions were free to determine their own producer prices for the next season, although they chose to offer uniform prices throughout the country.

The largest reforms came with the Cotton Act of 1994, when the government for-

mally eliminated the monopoly held by the board and the cooperative unions and allowed competition in cotton marketing and ginning. At the time there were 14 regional cooperative unions licensed to trade cotton. In 1994/95 some 22 private companies started trading cotton, and 8 new private ginneries were constructed. That opened up another marketing channel, especially in Western Tanzania. In Eastern Tanzania, where production was low and some farmers had no buyers, the Tanzanian Cotton Lint and Seed Board (the new name of the Tanzania Cotton Marketing Board as of 1995) acted as buyer of last resort.

By 1996/97 private businesses were purchasing almost half of all cotton. Private traders and ginneries were able to capture a considerable share of the market because they offered higher prices than cooperative unions and paid promptly. Some private ginneries also engaged in contract farming, providing inputs (seeds and occasionally fertilizer) to producers who agreed to supply cotton in return. The ginneries and producers usually established a minimum price at planting time, but the price could be adjusted if the market price was higher during the harvest.

The outcome of cotton reforms in Tanzania has been mixed. On the positive side, the share of producer prices increased to 51 percent (from 41 percent prior to the reforms). Furthermore, growers farmers receive payments quickly, a major achievement compared to 6-month delays encountered prior to the reforms. And, contrary to what many reports show, quality of cotton appears not to have suffered considerably. On the other hand, cotton production after 1995/96 has averaged less than before reforms (55,000 and 61,000 tons, respectively). On the policy side, the Cotton Board along with the two line Ministries (Agriculture and Food Security as well as Cooperatives) still play a major role in the sector which goes far beyond the regulatory role they are supposed to play. Collection and dissemination of data (as well as accuracy of statistics) are poor even by the government's own admission.

Francophone Africa

The modern cotton industry in West African countries was pioneered by the French state-owned Compagnie Française de Développement des Fibres Textiles (CFDT). As countries gained independence they established their own national cotton companies, but the CFDT retained a minority shareholding position (usually holding around one-third of shares) in these companies and entered into technical agreements with them. It also retained an ownership interest in companies engaged in processing cotton by-products. The national cotton companies have a legal monopsony in seed cotton, and most have a monopoly in ginning, marketing, and providing inputs to farmers. They announce a base buying price for seed cotton before planting starts, sometimes supplementing this price with a second payment. Any supplement is based on the company's financial results for the season and is paid on production the following season. Village producer associations handle intermediate input credit and seed payments, and input credits are deducted from payments for cotton.

Aided by research in Africa and France, cotton growing expanded rapidly in West Africa, increasing more than fourfold in the past 25 years. During the 1999/ 2000 season, West and Central African countries produced 930,000 tons, or 5 percent of world production. The region is the third-largest cotton exporter after the United States and Uzbekistan, accounting for almost 15 percent of world exports. Farmers use chemical inputs and seed varieties well adapted to local conditions to produce high yields and consistent quality cotton. The industry is bolstered by high repayment rates for input credits and well-organized producer associations.

The system has a number of weaknesses, however. The prices West African producers receive tend to be very low. For example, farmers in Zimbabwe and India received, respectively, 37 and 60 percent more for similar types of cotton from 1983 until 1995. Since 1994 (when the CFA franc devaluation took place), prices in Zimbabwe and India have been 80 percent to 100 percent higher than prices in West Africa. The services the cotton companies provide (extension services, rural road maintenance, and transportation to move seed cotton to gins) are only partially responsible for the price differences. A large part of the gap between domestic and export prices of cotton has been absorbed by governments in the form of various taxes (export taxes, taxes on parastatal profits, etc.) This money has, in part, been used to subsidize other groups, especially domestic textile firms through low prices charged for cotton, and low prices for cotton seed supplied to the domestic oil and meal companies. The absence of any competition in domestic markets has often allowed costly operating inefficiencies on the part of the parastatal companies, especially in the export marketing of lint. More generally, the system creates opportunities for rent seeking and corruption, generally at the cost of farmers and the economy.

The determination of annual cotton prices reflects the relative bargaining power of a number of groups; namely, producers, governments, managers of the state-owned cotton companies, the CFDT, and in some cases private ginning firms. Pan-territorial pricing of cotton and farm inputs means that transport costs are not properly taken into account in the determination of where cotton is grown. Furthermore, the uniformity of cotton input and output prices across entire countries, effectively transfers resources from producers who are close to ginning or distribution centers to those who are further away. Farmers have limited autonomy as regards decisions on the types and quantities of the seeds and other inputs they use. Pan-seasonal pricing of seed cotton and planned delivery schedules to ginning plants severely limit farmers' choices on holding seed cotton inventories. The system also restricts the use of seed cotton as collateral to borrowing for cotton inputs only, which underutilizes the potential of cotton production to support rural credit flows. Finally, the system does not respond flexibly to changes in world market conditions. For example, in the late 1980s and early 1990s low world prices and an overvalued currency led to the *de facto* bankruptcy of a number of state cotton companies. The companies had to be drastically restructured, supported by injections of money from national governments and international aid organizations.

During the past several years, in conjunction with the AFD (Agence Française de Développement), the World Bank has held intensive discussions with the governments and other stakeholders in West and Central Africa, including the cotton parastatals, CFDT, and input suppliers. These discussions resulted in two broad proposals: retaining the cotton companies but reforming and regulating them, and introducing free entry and competition.

The first proposal involved a number of steps including:

- setting prices at levels appropriate to a competitive environment;
- giving producers equity in the national cotton companies and more influence over key decisions, especially price setting;
- subcontracting activities such as providing inputs and transportation to private firms; and
- eliminating subsidies on sales of cotton lint and cotton seed to domestic textile firms and oil mills.

The advantage of this proposal is that it reduces the risk of damaging the current system—which has many desirable aspects—with more far-reaching reforms. Maintaining the current system's ability to recover research and extension costs and its high repayment rates on input loans is especially important. The proposal has two weaknesses, however. First, domestic prices are unlikely to move in line with world prices (a supposed goal of the reform process), because large shares of national income are at stake. The price-setting mechanism has been (and is likely to remain) political because a number of interest groups are involved in the negotiations. Second, the proposal is incompatible with initiatives to establish free trade among countries in the region under the two regional arrangements, (Union Economique et Monétaire Ouest-Africaine, UEMOA and Communauté Economique et Monétaire de l'Afrique Centrale, CEMAC). New trade arrangements would require reforming the cotton industry again.

The second proposal, which involves free entry calls for:

- opening the sector to competitive entry at all levels and hence linking domestic prices to international prices which would vary according to transportation costs and the season;
- maintaining and strengthening research, extension, and phytosanitary regulations where the government has an essential role;
- strengthening farmer groups and facilitating their participation in voluntary contract farming arrangements;
- freeing the cotton industry from sector-specific taxation and subjecting it only to economy wide taxes; and
- increasing the efficiency of regional ginneries by harmonizing reforms of cotton trade across West African cotton zones.

In some countries free entry may be all that is needed to generate a competitive system. In other countries privatization of the national cotton companies and subsequent restructuring into a number of successor companies may be necessary. Such a move would signal the government's commitment to open markets and ensure that producers in every region have access to competitive markets for their seed cotton.

The World Bank has argued that the discipline and responsibility that a free-entry competitive system imposes on market participants would make for a more resilient, flexible, self-reliant, and more innovative national cotton sector. Improved competition through market reforms offers important opportunities for regional trade and cooperation, the latter in areas such as research, phytosanitary regulations, and seed development and certification. Most importantly, improved sector performance would contribute to alleviating poverty by raising cotton prices to levels enjoyed by farmers elsewhere in the world.

Significant developments have taken place during the last few years, which indicate the future direction of institutional changes in the region's cotton sector. Three producing countries, Benin, Côte d'Ivoire, and Togo, have now opened their sector to private ginners. Benin and Côte d'Ivoire, with a combined production of about 290,000 tons in the 1999/2000 season, have eliminated the monopoly power of their national companies and transferred key responsibilities to the private sector.

PART III: THE ISSUES

SYNTHESIS OF ISSUES AND STYLIZED FACTS

A number of market- and policy-related issues and stylized facts emerge from the preceding analysis.

- **Cotton is very important to a number of low income African and Central Asian countries**, in some cases contributing as much as 40 percent to merchandize exports and between 5 and 10 percent to GDP. Considering that in most countries cotton is a smallholder crop, the implications of price changes (either induced by market forces or policy interventions) as well as changes in market share are enormous. For example, a 40 percent reduction in price (i.e. equivalent to the price decline that took place from December 2000 to May 2002) implies a 7 percent reduction in rural income in Benin—a typical cotton producing country in West Africa.
- **Cotton faces intense competition from chemical fibers,** especially following technological improvements of the early 1970s which brought their prices down to cotton price levels. Since 1975, polyester and cotton have been traded at roughly the same price levels. Currently, the share of cotton in total fiber consumption is 40 percent (down from 68 percent in 1960).
- **Consumption growth of cotton** has been the same as population growth during the last 40 years, implying that if past trends continue, cotton consumption at the end than the current decade will be about 23 million tons (up from the current level of 21 million tons).
- **Cotton prices**, as is the case with most primary commodities, have been declining in real terms. Price variability during the post-1985 period has been 2.5 times higher of what it was during the pre-1973 period and it is about half of what it was during 1973-84.
- **Minimal border restrictions but considerable domestic support.** Major subsidizers are the United States, $3.7 billion in 2001/02 and the European Union—Greece and Spain—$0.7 billion (compare this to $20 billion, the value of world's cotton production, evaluated at 2001 prices and quantities). This level of support implies that prices received by US and EU cotton producers are 87 and 160 percent above world prices. China has been reportedly supporting its cotton sector during the last few seasons by an estimated $1.5 billion annually, but this figure cannot be substantiated due to the complexity of Chinese policies and the quality of data (this does not necessarily imply that China does not support its cotton sector).
- **Many cotton producing countries have reacted by introducing offsetting support.** Support in Turkey, Brazil, Mexico, Egypt, and India, totaled $0.6 billion during 2001/02.
- **Domestic support by major producers has triggered some noteworthy reactions.** Brazil initiated a WTO consultation process claiming losses to its cotton exports due

to subsidies by the United States. More recently, four West African cotton producing countries (Benin, Burkina Faso, Chad, and Mali) pressed for removal of support to cotton sector through the WTO. In an unusual move, the President of Burkina Faso addressed the WTO on June 10, 2003, asking for financial compensation for cotton producing low income countries to offset the injury caused by support. This compensation, according to the request, should be in place for as long as subsidies are in place.

- **The cotton sector has found an unlikely ally.** The Director General of the International Rayon and Synthetic Fibres Committee in a letter to the *Financial Times* on June 12, 2003 complained that "recent increases in cotton subsidies have rigged the market even more dramatically in favor of cotton, depressing demand for every substitute product. The result is industrial plants being kept idle… that were built in legitimate expectation that the competitive advantages of manufactured fibers would create demand to fill the capacity…"
- **If support is completely removed** (including full implementation of the Agreement on Textiles and Clothing), cotton prices would be at least 15 percent higher than they would have been in the absence of reforms.
- **The prospects for eliminating support by major producers are slim at best.** The United States introduced the *2002 Farm Bill*, which is expected to be in place for the next 6 years—historically *Farm Bills* have given more than what they promise, not less. The European Union reformed its cotton policy in 1999. Its forthcoming expansion does not affect the cotton sector since none of the new entrants is cotton producer. A shift from price support to decoupled payments, however, if designed and implemented properly, is likely to reduce production by the main supporters and consequently boost world prices.
- **A number of East African cotton producers undertook reforms during the 1990s**. Research has shown that whenever the reform process was completed or there was no backtracking supply response took place and growers received higher share of f.o.b. prices, both considerable achievements in an environment of declining world prices.
- **The World Bank and other institutions have advocated reforms in the cotton sectors of West Africa** during the last 6 years and extensive consultations have taken place among the relevant stakeholders. The World Bank's position (which has been clearly articulated on several occasions) is in favor of competition in the cotton sector while retaining the positive elements of the current system, not outright privatization.

RECOMMENDATIONS

Given the highly distorted nature of the cotton market and the fact that millions of rural poor households in developing countries depend on this commodity, what are the alternatives? On the demand side, cotton promotion is something that must be pursued by all cot-

ton producers. There are two encouraging sings regarding cotton promotion. First, the US has an active cotton promotion program with an annual budget of about $60 million. The main feature of this program is raising consumers awareness of cotton through the "Seal of Cotton" campaign. According to Skelly (2003) there is a strong correlation between the program's advertising campaign and cotton's market share in the US.

Second, an initiative was undertaken recently through the International Cotton Advisory Committee to establish an international cotton promotion program. To that end, the International Forum for Cotton Promotion (IFCP) was established in 2003. The principal objective of the Forum is to encourage and facilitate national market development programs, organized by associations and commercial organizations in individual countries, and funded from domestic resources. The Forum is to achieve this objective by serving as a clearinghouse for the exchange of proven ideas and strategies to be implemented by national organizations, and by facilitating the establishment and expansion of national demand enhancement efforts. While it is too early to assess the performance of the Forum, it is certainly a step in the right direction.

Developing Countries

As discussed earlier, a number of developing countries, especially in sub-Saharan Africa have undertaken policy reforms during the 1990s. Setting aside the lively debate on the motives of the reforms, in many respects the reforms have been successful. For example, in the few cases reviewed here, cotton growers received higher share of fob prices, they also received payments more promptly, and there was considerable supply response. In an environment of declining commodity prices, these are not trivial achievements. However, in a number of cases, the reform process has not been completed (Tanzania), it has been reversed (Zimbabwe), it has been slow (West Africa), or it has not even started at all (Uzbekistan). In these cases further reforms are the only feasible alternative.

A second issue that should receive attention is the enabling policy environment regarding the use of genetically modified cotton. In China for example, where GM cotton is used extensively by small-holders, the costs of producing cotton declined by 20-25 percent. This cost reduction meant doubling the net income for cotton growers. One should also note that GM cotton has not been subject to negative consumer reaction as has been the case with GM food products.

A third issue (and closely related to GM cotton) is organic cotton. Producers of organic products typically command significant premia. However, organic cotton production has not been as profitable as other organic crops (such as coffee and tea). The main reason is weak demand which appears to be a reflection of the "distance" between the farm product—cotton—and the final product—cloth. It is because of this distance that GM cotton has not faced resistance by the consumers, which further reinforces the conclusion that GM cotton is something that developing countries should consider seriously.

Developed Countries

The price prospects (and consequently the export shares of low cost producers, including many African countries) can be improved considerably if support by developed countries is reduced substantially or eliminated altogether. However, given the low probability of eliminating support, a second best alternative would be for support to be given in a non-distortionary manner. A type of support with minimal distortionary effects—the so-called decoupled support mechanisms—has re-gained popularity recently. Income transfers under decoupled mechanisms are based on past production and prices and thus have no effect on current production decisions.

Decoupled support was attempted in the European Union with the Common Agricultural Policy reform of 1992, in Mexico with the PROCAMPO program of 1994, and in the United States with the Freedom to Farm Act of 1996. The outcome of these programs has not been encouraging. The reason was that these schemes did not include three essential conditions that would make them successful: (i) substituting all support mechanisms with decoupled support; (ii) limiting the duration of the programs which would have made them true transition mechanisms and (iii) not requiring that resources remain in agricultural use which would reduce the overall supply of the commodities under consideration and hence lift world prices (Baffes and Meerman 1998). Unless these conditions are met, any attempts to restore the credibility of decoupled support policies and ultimately remove support to the cotton (and other) sector(s) are unlikely to have the beneficial impact intended.

What makes decoupled support in the cotton sector an interesting (and potentially applicable) alternative is that almost all support comes in the form of domestic measures. Therefore, changing the nature of support does not require changing the sources of funding as it would in the case of border measures.

Recently the EU proposed changes in its cotton policy (see Box 1). According to the proposal, about €800 million (approximately equal to the current budgetary outlays of the cotton program) will be allocated as follows: (i) €420 million on decoupled payments; the only requirement for these payments is that producers must have planted cotton during 1999, 2000, and 2001; (ii) €280 million on area payments (if plantings exceed 425,360 hectares, support per hectare will be reduced proportionately); and (iii) €100 million to be spent on rural development measures. Although the proposal is a step in the right direction, two shortcomings must be highlighted. First, it unties 60 percent of support, not all support, which is one of the main shortcomings of current decoupling schemes. Second, 40 percent of the support is linked to total area, thus not fully removing the incentive to overproduce.

NOTES

[1] The terms man-made and chemical fibers are used interchangeably in this paper. Often, the literature refers to man-made or chemical fibers as synthetic fibers, probably a reflection of the fact that non-cellulosic fibers are also called synthetic polymers as opposed to cellulosic fibers whish are called natural polymers.

[2] The shares in world's total fiber consumption in 1925 were: cotton, 84.2 percent; wool and flax, 13.5 percent; silk, 0.7 percent; and rayon, 1.6 percent. In 1946 they were: cotton, 72.6 percent; wool and flax, 15.4 percent; silk, 0.2 percent; and rayon, 11.8 percent.

[3] The only period when prices increased in a sustained manner was between 1730 (the earliest price records) and 1790, 3 years prior to the invention of the ginnery (Baffes 2003).

[4] The validity of these percentage changes depends on the stationarity properties of the variables under consideration. In order to highlight the importance of this issue, all growth rates reported in this paper have been estimated with OLS and all relevant statistics along with their interpretation are reported in Appendix C.

[5] Not all these technological improvements have been shared equally by all cotton producers. For example, mechanical harvesting is being practiced in the United States, EU, Australia, and to some extent in Brazil, representing approximately 30 percent of cotton production. The remaining cotton is hand-picked.

[6] The 1984/85 price decline is considered as a structural break. One may argue, however, that if the policy shift in the US, which caused the massive de-stocking, was the main reason behind the price decline, a new stock equilibrium level would cause a price increase. What is argued here is that the policy shift accelerated the price decline which would have taken place in the long run. Real cotton prices did rise later but never reached the pre-1984 levels.

[7] Although GM cotton was first grown in the US, China was the first country to commercially produce GM tobacco and tomatoes.

[8] Carl et al. (2001) also found that the increased use of GM cotton in China was associated with considerable positive health effects, i.e. fewer hospitalizations from pesticide poisoning. That was expected as according to the survey farmers who did not use *Bt* cotton had to spray, on average 12 times, while farmers who used *Bt* cotton had to spray only 3 to 4 times.

[9] The Step-2 mechanism is often referred to as export subsidy. Its objective is to eliminate the difference between the higher US domestic prices and world prices so the US cotton exporters maintain their competitiveness. Because it is a subsidy to millers, whose end product may either be consumed domestically or be exported, the Step-2 payment is equivalent to a production subsidy. Ironically, US cotton producers are subsidized in all three conceivable scenarios: (i) when prices remain constant (through the production flexibility contracts); (ii) when prices fall (through the loan rate and counter-cyclical payments); and (ii) when prices increase (through the Step-2 mechanism.)

[10] Following the September 1999 reforms, the Chinese Ministry of Agriculture in collaboration with FAO holds conferences every two years in order for local officials to familiarize themselves

and exchange ideas concerning developments in the cotton market. These conferences have become useful venues for information and data dissemination.

[11] Chinese stocks have been subject to lively debate within the cotton industry, because (i) the accuracy of the data is questionable and (ii) the quality of cotton stocks is unknown.

[12] As of May 2002, there were 36 eligible AGOA countries. Cotton producing countries which have been declared eligible for apparel provision under AGOA are: Benin, Cameroon, South Africa, Uganda, Tanzania, Zambia. Chad, Côte d'Ivoire and Nigeria are eligible under AGOA but non-eligible under the apparel provision. Notable exceptions from AGOA are Angola, the Democratic Republic of Congo, and Zimbabwe.

Box 1:The 2003 EU Reform Proposal for Cotton

On September 23, 2003, the EU Commission proposed to reform its cotton, sugar, and tobacco sectors. Under the cotton reform proposal, the EU support to the cotton sector will consist of the following parts: *(i)* a single farm payment scheme, *(ii)* production aid scheme, granted as an area payment, and *(iii)* development measures. The proposed reform is schedules to be effective during the 2005 season. The projected annual budgetary expenditure for the new scheme will be about €800 million, approximately equal to the current level of budgetary outlays. The first and second components of the new program will absorb €700 million, 60 percent of which (€420 million) is earmarked for the single payment and 40 percent (€280 million) for the area payment. The only requirement for the single farm payment is that recipients must have planted cotton during the 1999, 2000, and 2001 seasons, making it a fully decoupled payment. The area-coupled payment is given in order to prevent production disruption in areas with a high economic dependency on cotton.

The area payment would be given for a maximum area of 425,360 hectares (340,000 ha in Greece, 85,000 ha in Spain and 360 ha in Portugal) and would be proportionately reduced if payment claims exceed the maximum area of a Member State. It could be differentiated on the basis of specific criteria, relating to the participation of producers in an inter-branch organization which would be approved by Member States and subject to controls. A maximum of half of the area payment to members of an inter-branch organization could be determined according to inter-branch scales, rewarding production deliveries in quality and quantity terms. The activities of each inter-branch organization would be financed by its members and by a Community grant of €10 per hectare. That support is expected to be about €4.5 million. The balance with the total market expenditure for cotton will be included in a restructuring envelope for cotton areas.

This last component of the proposal (€100 million) would be shared between Member States according to the average area eligible for aid over the reference period and would serve an additional financial instrument within the second pillar of the CAP in order to fund rural development measures. It may be used either for more beneficiaries, more measures, or even an increased aid intensity of existing rural development measures.

Source: European Commission (2003).

TABLE 1

COTTON'S IMPORTANCE TO DEVELOPING AND TRANSITION ECONOMIES: 1998-99 AVERAGES

	COTTON EXPORTS			MERCHANDIZE EXPORTS (million US dollars)	PER CAPITA GDP[a]
	Million US dollars	percent of merchandize exports	percent of GDP		
Burkina Faso	127	43.9	5.1	289	249
Benin	164	39.1	7.1	419	398
Uzbekistan	1,038	32.2	6.5	3,227	467
Chad	76	32.2	4.7	236	224
Mali	180	29.5	6.7	611	285
Togo	67	21.3	4.7	315	341
Tajikistan	97	15.1	8.2	643	352
Turkmenistan	110	12.3	3.6	891	1,126
Tanzania	44	7.6	0.5	576	185
Syria	214	6.7	1.4	3,177	858
Sudan	41	6.0	0.4	688	290

a. Constant 1995 US dollars.

Source. FAO (FAOSTAT) and World Bank (World Development Indicators).

TABLE 2

GOVERNMENT ASSISTANCE TO US COTTON PRODUCERS, 1996/97-2001/02

	1996/97	1997/98	1998/99	1999/2000	2000/01	2001/02
Assistance (million US $)						
Loan Deficiency Payments	0.0	6.0	320.7	687.3	151.4	732.1
Marketing Loan Gains	0.0	26.2	239.8	859.8	390.3	1,512.8
Forfeitures	1.6	0.3	3.3	1.1	17.2	0.1
Production Flexibility Contract	699.3	597.5	637.0	614.0	575.2	473.9
Market Loss Assistance	0.0	0.0	316.2	613.5	612.8	523.6
Insurance	157.2	147.7	154.9	223.3	215.8	266.4
Step-2	19.8	466.7	214.4	486.1	252.7	125.1
Total	**877.9**	**1,244.4**	**1,886.3**	**3,485.1**	**2,215.4**	**3,634.0**
Production (thousand tons)	**4,124**	**4,303**	**3,251**	**3,832**	**3,742**	**4,420**
A Index (US$ per kilogram)[a]	**1.73**	**1.60**	**1.30**	**1.16**	**1.26**	**0.92**
Assistance (US$ per kilogram)	**0.21**	**0.29**	**0.58**	**0.91**	**0.59**	**0.82**
Assistance (% of the A Index)	**12%**	**18%**	**45%**	**78%**	**47%**	**89%**

a. August to July average.

Sources: United States Department of Agriculture (assistance), International Cotton Advisory Committee (production), and author's calculations the rest.

TABLE 3

EFFECT OF REMOVAL OF DISTORTIONS (PERCENTAGE CHANGES OVER BASELINE)

	2003/04	2005/06	2007/08	2009/10	2011/12	Average[a]
World Price	15.6	13.7	13.0	12.2	11.7	12.7
Exports						
Africa	12.1	15.1	14.0	13.1	12.3	12.6
Australia	3.9	3.0	2.7	2.3	2.1	2.7
United States	-8.4	-6.6	-4.0	-1.5	0.9	-3.5
Uzbekistan	5.4	6.9	6.7	6.4	6.2	6.0
World	3.9	5.6	6.2	6.7	7.3	5.8
Production						
United States	-18.3	-7.9	-5.9	-4.1	-2.3	-6.7
European Union	-77.4	-77.7	-78.3	-78.8	-79.0	-70.5
Uzbekistan	3.1	4.7	4.6	4.4	4.2	4.0
Africa	4.5	7.5	7.1	6.7	6.3	6.0

a. Average is taken over the 10-year period 2001/02 to 2010/11.
Source: FAPRI (2002).

Figure 1: The Classification of Fibers

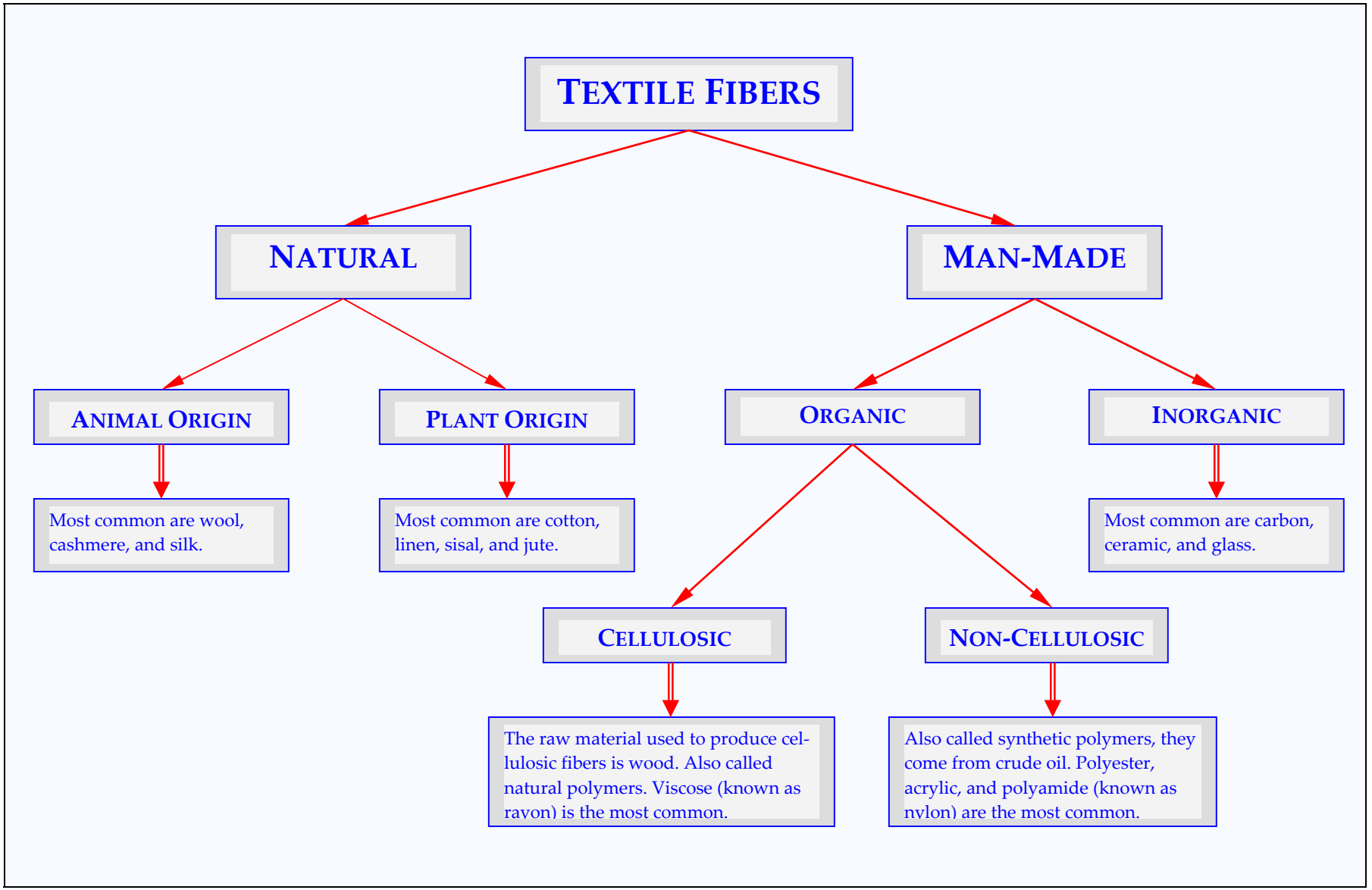


Figure 2: Cotton's Share in Total Fiber Consumption (percent)

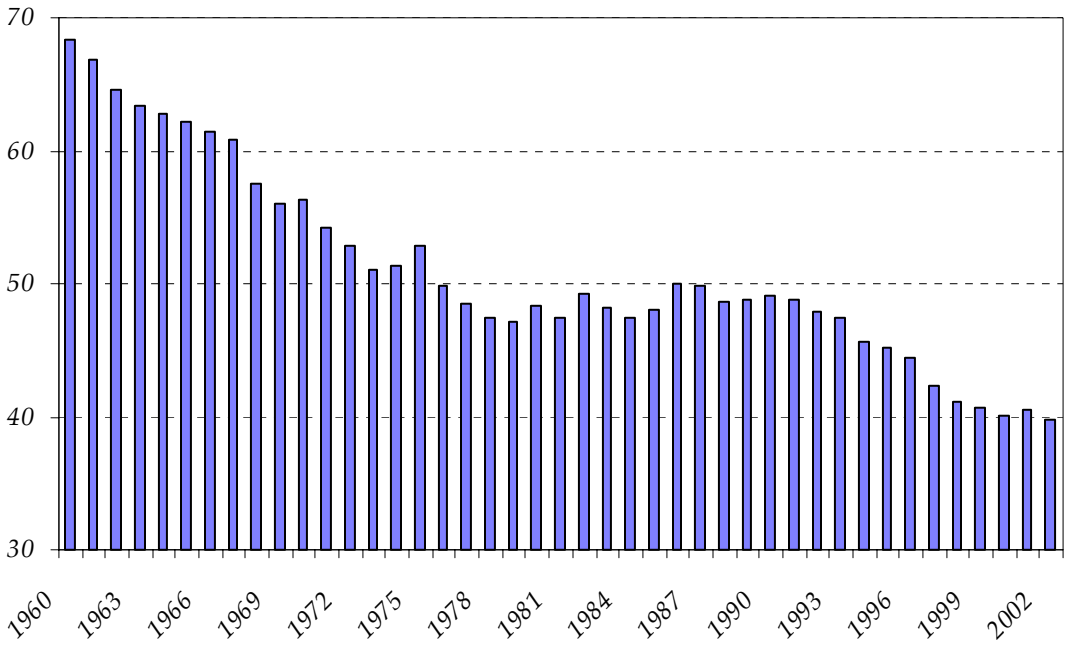


Figure 3: Polyester to Cotton Price Ratio

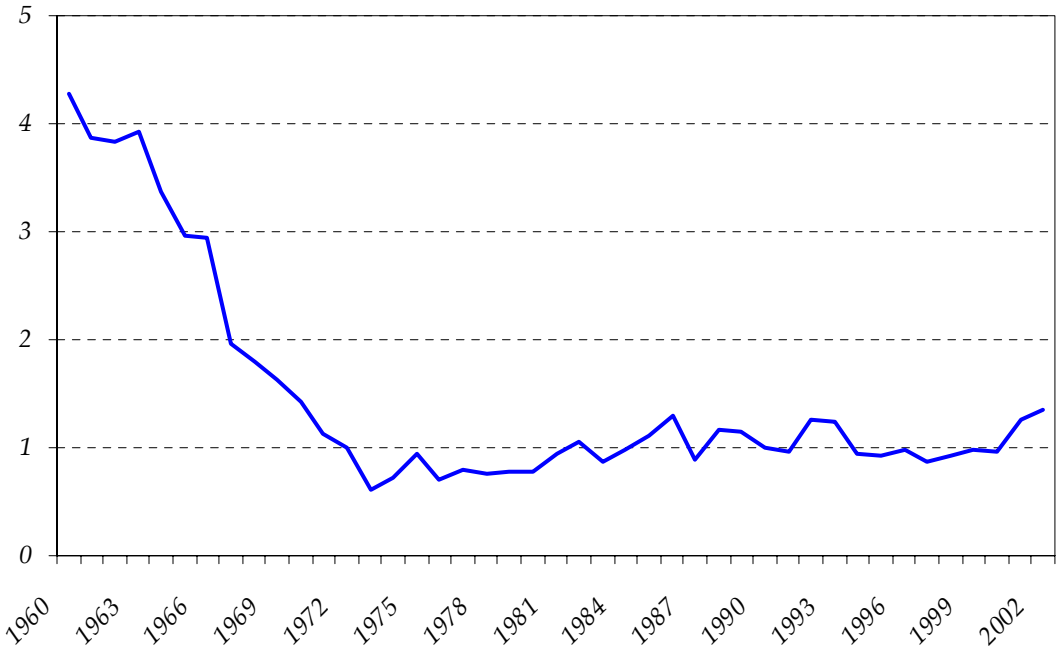


Figure 4: World Fiber Consumption (thousand tons)

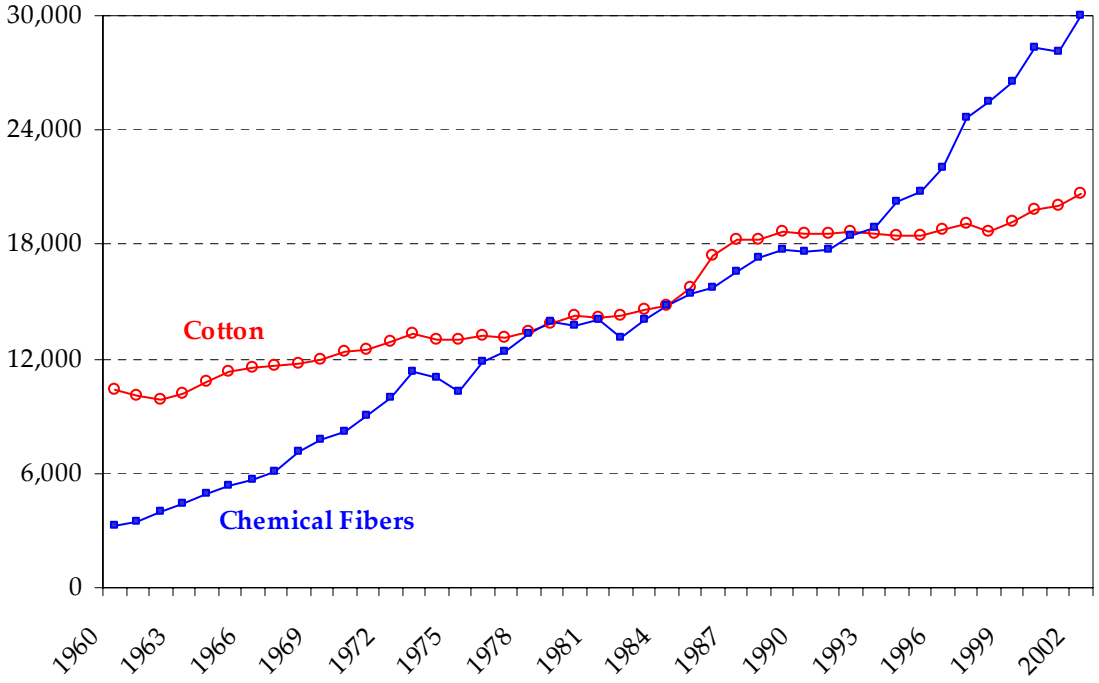


Figure 5: World Per Capita Fiber Consumption (kilograms)

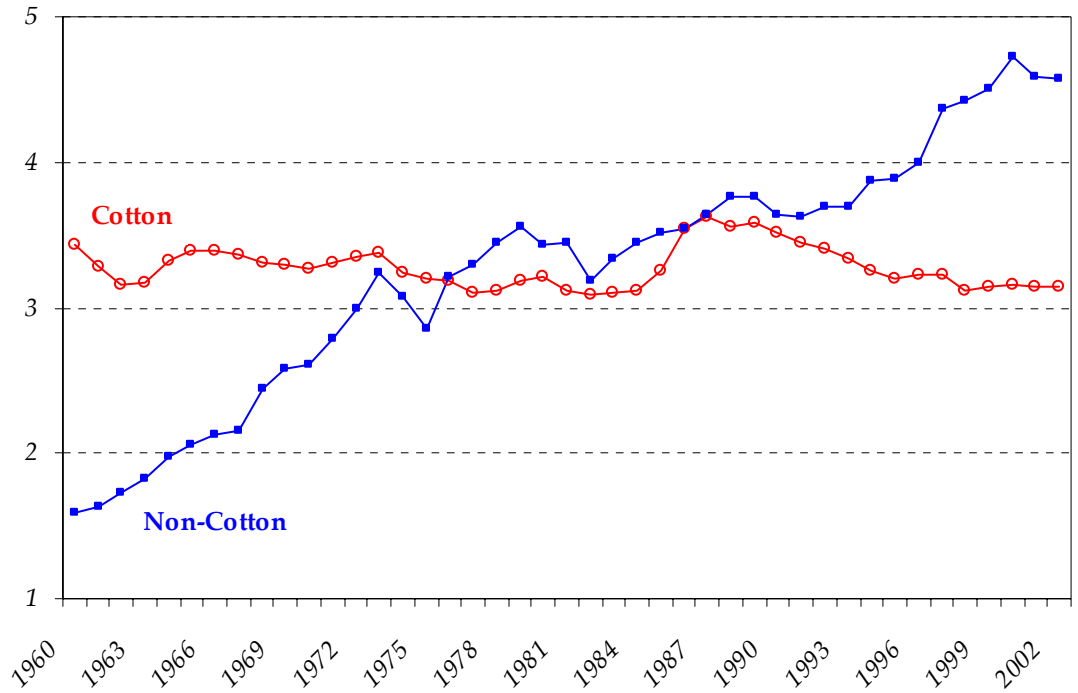


Figure 6: Annual A Index (US$ per kilogram)

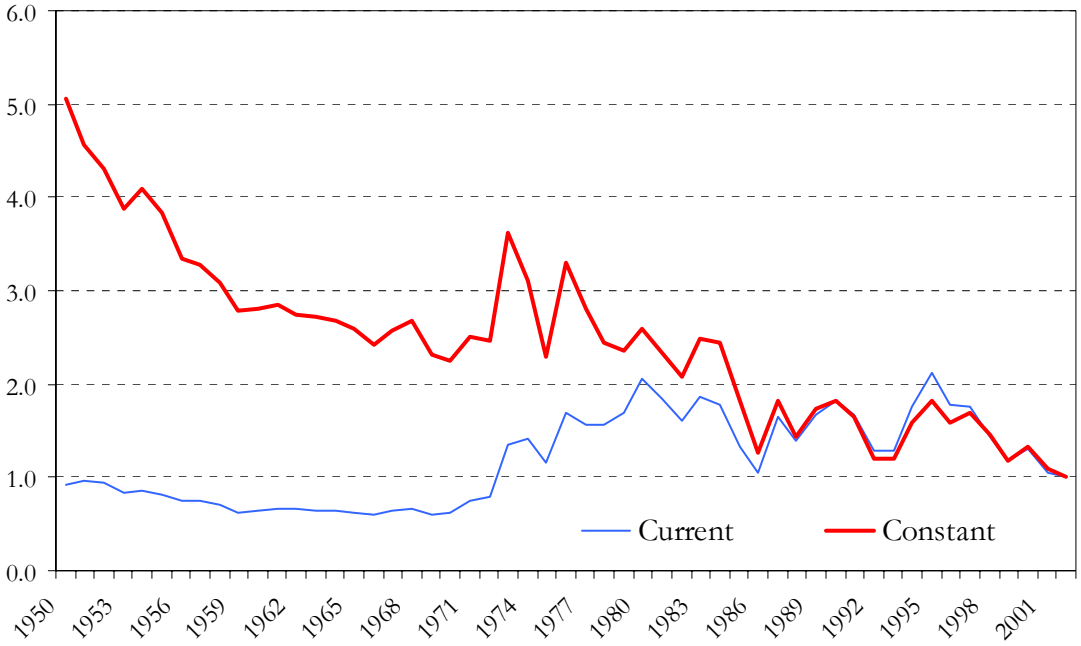


Figure 7: Monthly A Index (US$ per kilogram)

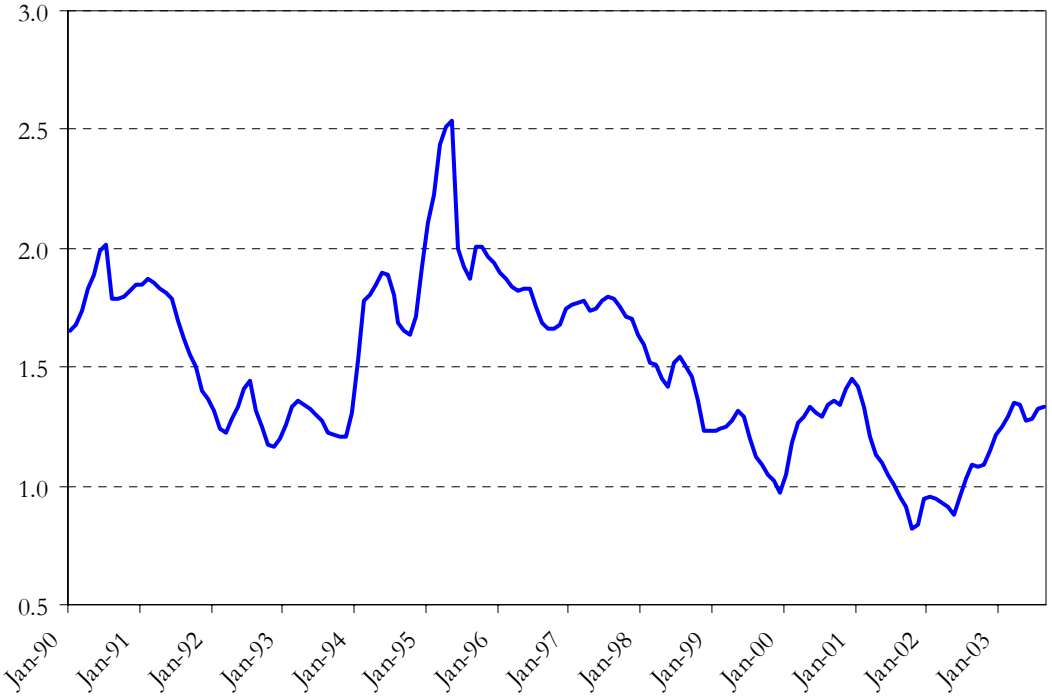


Figure 8: Cotton Production in Europe (thousand tons)

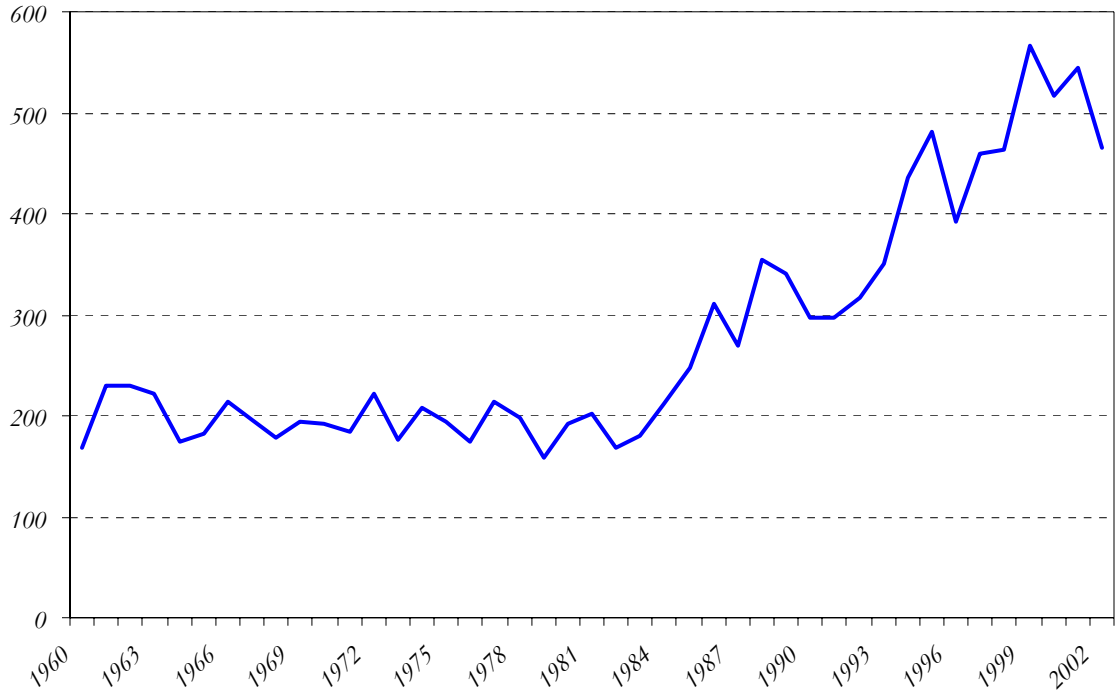
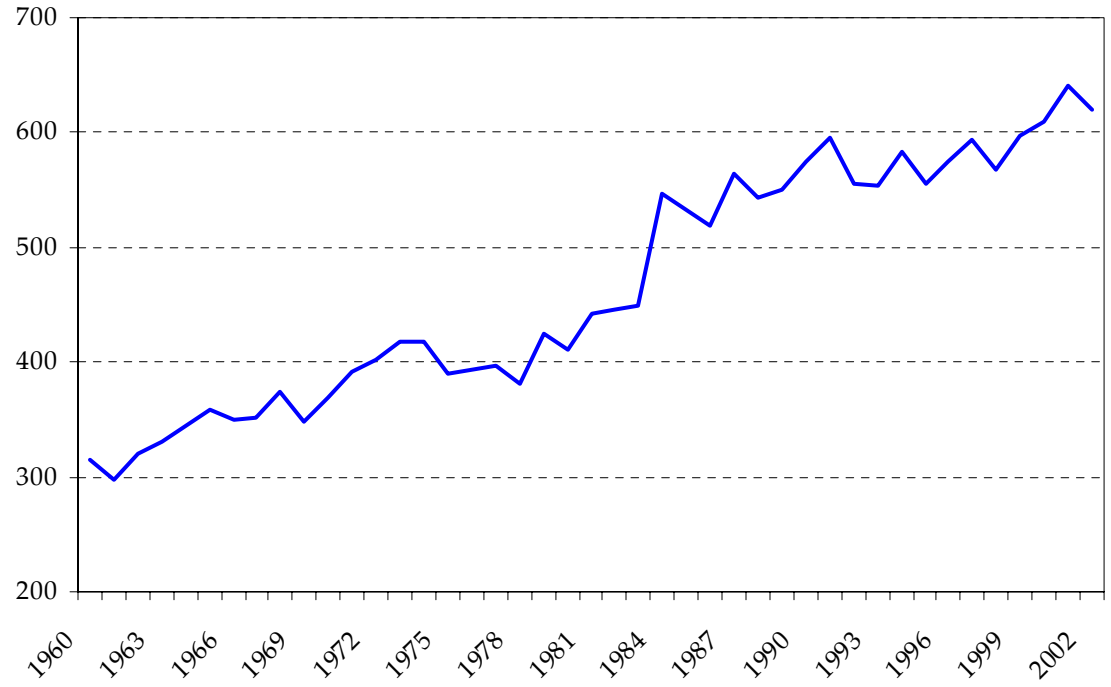


Figure 9: World Cotton Yields (kilograms per hectare)



PART IV: THE FACTS

APPENDIX A: CONCENTRATION INDICES

One way to measure the degree of concentration is to use the Herfindahl concentration index. This index is defined as the squared sum of, say, export shares of all countries; values close to unity indicate that a single country accounts for most exports; values close to zero, indicate that a large number of countries have equal export shares. In technical terms, let X denote global cotton exports and X_i cotton exports of country i. Then concentration of exports, I_X, is defined as $I_X = \Sigma_i(X_i/X)^2$. If $I_X = 1$, a single country accounts for all exports. If $I_X \approx 0$, a large number of countries have equal shares.

The figures that follow depict the evolution of the concentration of exports and imports (figure A1), concentration of production and consumption (figure A2), and concentration of stocks (figure A3). During the last 40 years, concentration of cotton imports declined from a high of 8 percent in 1960 to a low of 4 percent during the late 1990s. Cotton exports have been far more concentrated than imports. Moreover, the concentration of cotton exports is more variable than the concentration of imports. The spike in the index of cotton exports in the early 1990s is due to Central Asian cotton production, which is being recorded as trade after the disintegration of the Soviet Union.

Concentration of consumption fluctuated around an average of 9 percent during the first 2 decades of the sample and increased thereafter. The peak in the concentration of production during the mid-1980s reflects China's production boom. The first peak in the concentration of stocks is due to the US (stockholding policies of the Commodity Credit Corporation). The latter two peaks are due to large stocks held by China.

TABLE A1: Concentration Index--Exports, Imports

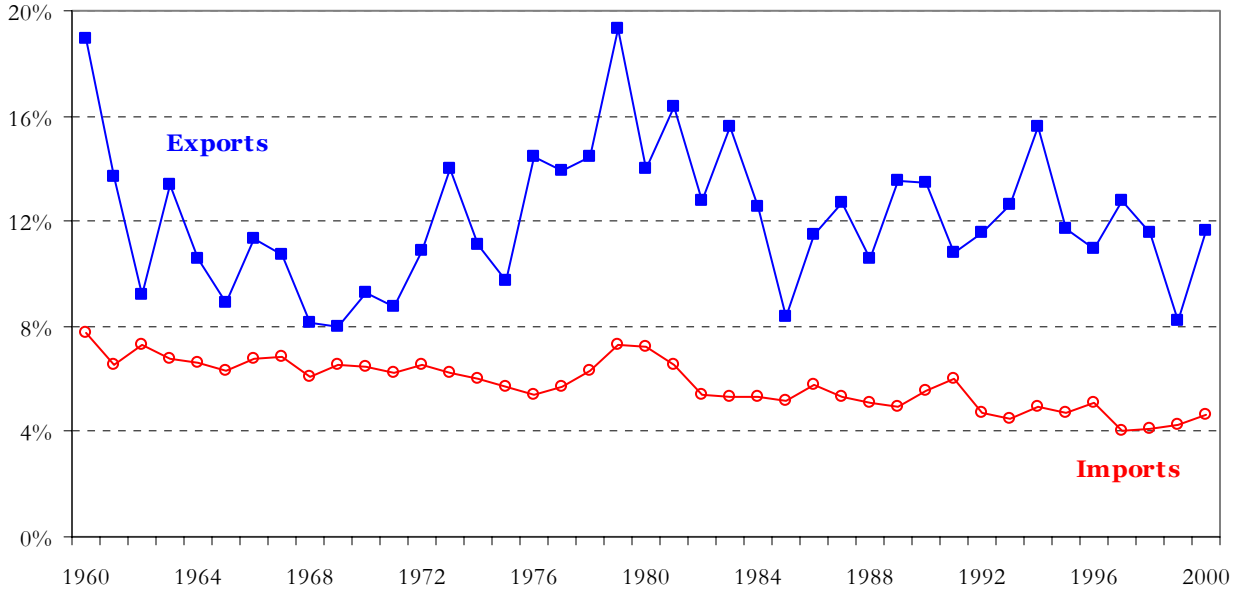


TABLE A2: Concentration Index--Production, Consumption

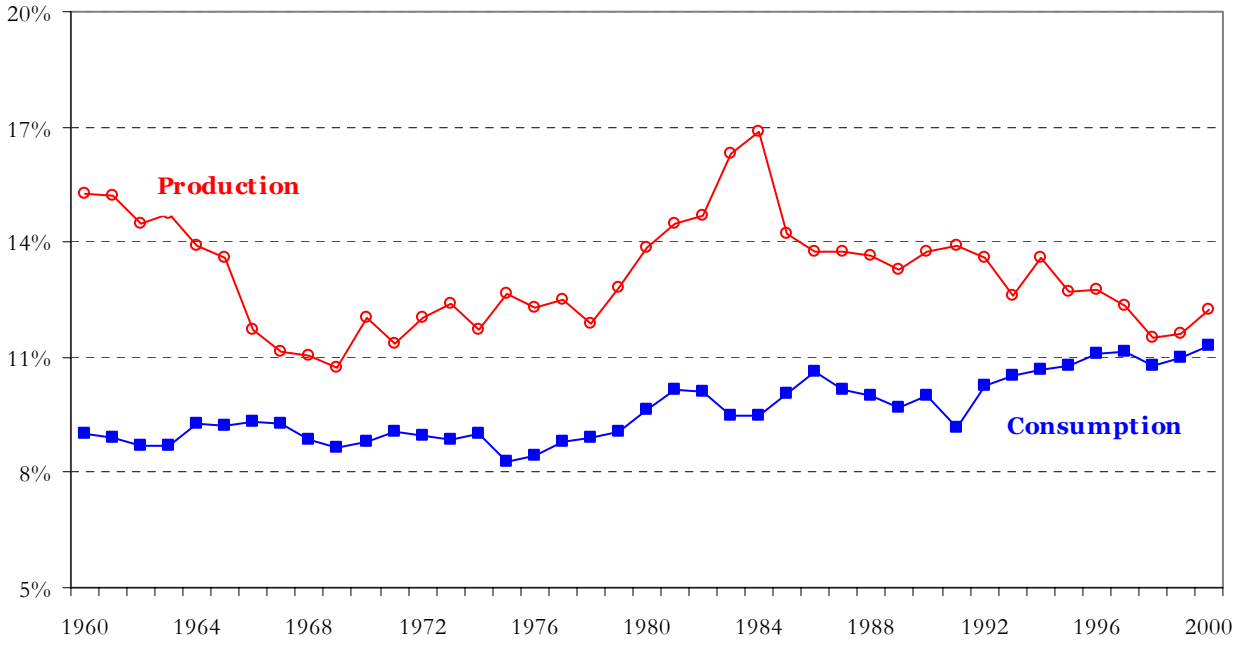
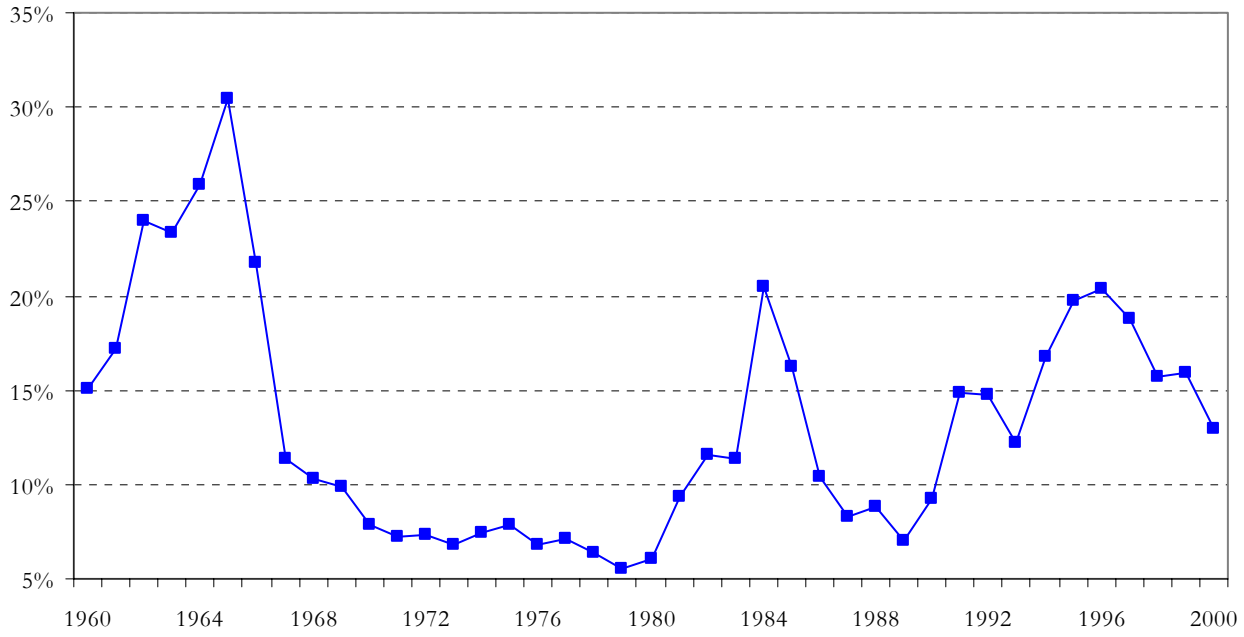


TABLE A3: Concentration Index--Stocks



APPENDIX B: GROWTH RATE ESTIMATION AND UNIT ROOTS

Typically, the growth rate between two-periods, say ρ, is calculated as:

$$\rho = (Q_t - Q_{t-1})/Q_{t-1}, \quad (1)$$

where Q_t is the variable of interest. Equation (1) can also be written as $Q_t = (1+\rho)Q_{t-1}$. Now let Q_t grow at rate ρ in all periods, while in each period it is subjected to stochastic shocks η_t. That is,

$$Q_t = (1+\rho)Q_{t-1}\eta_t. \quad (2)$$

It is assumed that the error term, η_t, is log-normally distributed with mean to equal 1, reflecting the proportionality nature of shocks.

From (2) it follows that $Q_{t-1} = (1+\rho)Q_{t-2}\eta_{t-1}$, which upon substitution back to (2) gives $Q_t = (1+\rho)^2 Q_{t-2}\eta_t\eta_{t-1}$. Recursive substitution yields:

$$Q_t = (1+\rho)^t Q_0\eta_t\eta_{t-1}\ldots \eta_1. \quad (3)$$

Taking logarithms in (3) and setting $\mu = \ln(Q_0)$, $\beta = \ln(1+\rho)$, and $\varepsilon_t = \Sigma_t \ln(\eta_t)$, gives:

$$\ln(Q_t) = \mu + \beta t + \varepsilon_t. \quad (4)$$

β is typically estimated with OLS and the growth rate is calculated as $\rho = \exp(\beta)-1$. Note that for small values of β, $\rho \approx \beta$.

In order to assess the performance of the model both conventional and stationarity statistics are used. Conventional statistics include *t*-ratios and the R^2 while the stationarity statistics include the augmented Dickey-Fuller (ADF) test (Dickey and Fuller, 1981). ADF is based on the regression $(x_t - x_{t-1}) = \mu + \gamma x_{t-1} + \text{lags}(x_t - x_{t-1}) + \upsilon_t$, where x_t denotes the series under consideration, the error term of (4) in this case; the lag length is selected so that υ_t is rendered white noise. A negative value of γ significantly different from zero indicates that x_t is stationary, often denoted as $I(0)$. To identify the presence of one unit root we test H_0: x_t is not $I(0)$ against H_1: x_t is $I(0)$. Another second test is the Phillips-Perron test (PP). If the unit root hypothesis is rejected (i.e. a high ADF or PP statistic in absolute value), which implies that the variable under consideration is stationary, we conclude that the growth rate can be summarily expressed by a single point estimate (see Baffes and Le Vallèe 2002 for details on estimation).

All growth rate estimates discussed in this paper have bee estimated as mentioned above for the 1960-2002 period and results are reported in Table B1. In four cases (real price of cotton, polyester to A Index ratio, world cotton consumption, and cotton production in Europe) growth rates have been estimated subject to structural breaks. With the exception of world cotton consumption, the respective dates for structural breaks reflect events that are believed to have altered the stochastic behavior of the variable under consideration. For the real price of cotton it was the change in the US support policy in 1985. For the Polyester to A Index ratio the break is in 1972, when polyester and cotton prices reached parity. For cotton production in Europe it was the

first EU expansion. Because no even is behind the world cotton consumption's structural break in 1985 (apart from visual inspection), the growth rate estimate based on the entire period is also reported.

TABLE B1

GROWTH RATE ESTIMATION RESULTS, ANNUAL DATA, 1960-2002

Period	μ	β	R^2	*DW*	*ADF*	*PP*	ρ
Real price of cotton (A Index deflated by the MUV)							
1960-1984	1.01	-0.004	0.03	1.64	-3.21**	-3.88***	-0.44
	(20.2)	(-1.31)					
1985-2002	1.06	-0.020	0.26	1.52	-2.51	-3.01*	-1.96
	(4.02)	(-2.61)					
Price of polyester to A Index ratio							
1960-1971	1.72	-0.123	0.93	0.99	-1.88	-1.96	-11.53
	(23.3)	(-12.2)					
1972-2002	-0.32	0.010	0.23	1.27	-3.94***	-4.20***	1.03
	(-3.42)	(3.18)					
World chemical fiber consumption							
1960-2002	8.40	0.046	0.94	0.11	-2.43	-2.33	4.69
	(180.5)	(24.9)					
World total fiber consumption							
1960-2002	9.56	0.030	0.98	0.25	-2.70*	-1.99	3.02
	(559.7)	(64.0)					
World cotton consumption							
1960-2002	9.20	0.017	0.96	0.30	-2.96*	-2.21	1.78
	(658.2)	(31.9)					
1960-1985	9.21	0.016	0.95	0.68	-3.20**	-2.41	1.65
	(804.6)	(22.1)					
1986-2002	9.61	0.007	0.78	0.85	-1.12	-2.09	0.67
	(308.4)	(7.62)					
World per capita cotton consumption							
1960-2002	1.19	-0.000	0.01	0.31	-3.04**	-2.34	-0.04
	(87.5)	(-0.69)					
World per capita non-cotton fiber consumption							
1960-2002	0.66	0.022	0.87	0.18	-2.34	-2.19	2.22
	(20.4)	(17.1)					
Cotton's share in total fiber consumption							
1960-2002	4.15	-0.010	0.87	0.20	-1.95	-2.03	-1.04
	(269.2)	(-12.2)					

continued

TABLE B1 (continued)

GROWTH RATE ESTIMATION RESULTS, ANNUAL DATA, 1960-2002

Period	μ	β	R^2	*DW*	*ADF*	*PP*	ρ
Cotton Production in Europe							
1960-1982	5.31	-0.004	0.04	2.24	-5.56***	-6.46***	-0.44
	(119.5)	(-1.34)					
1983-2002	4.13	0.053	0.86	1.40	-3.07**	-3.51**	5.39
	(24.3)	(10.4)					
World cotton yields							
1960-2002	5.73	0.016	0.94	0.88	-2.44	-3.39**	1.77
	(323.2)	(24.9)					
Real world GDP							
1960-2002	3.81	0.035	0.99	0.08	-2.45	-2.35	3.58
	(261.2)	(60.9)					
World population							
1960-2001	8.02	0.017	0.99	0.03	-2.63*	-0.67	1.76
	(1853.3)	(99.5)					

Notes: Numbers in parentheses denote *t*-ratios. DW denotes the Durbin-Watson measure of serial correlation. ADF and PP refer to the Augmented Dickey-Fuller and Phillips-Perron stationarity statistics. ρ denotes the annual growth rate. Asterisks denote rejection of non-stationarity at 10% (*), 5% (**), and 1% (***) level of significance. Rejection of non-stationarity implies that the variable under consideration is trend stationary and hence the estimated growth rates are valid representations of the true growth rate.

APPENDIX C: PRICE VARIABILITY

Calculating price variability is a complicated issue for at least two reasons. First, variability must be defined around some statistic, typically the first moment of the distribution. As expected, different statistics around which price variability is defined will yield different outcomes. Second, the statistical properties of prices may also pose difficulties in calculating variability. Prices are typically non-stationary, implying that as we move further away from a certain point, the probability that the price will return to that initial point becomes smaller. In technical terms, non-stationarity implies that the first two moments of the distribution do not exist. The remaining of this appendix measures cotton price variability and whether it has changed during the past 40 years by taking into consideration these two difficulties.

The most widely used indicator of variability is the standard deviation. It measures how widely values of a sample are dispersed around its average. It is defined as the sum of the square of each deviation from the mean, μ, divided by the number of observations, n. Let P_t denote the price at time t. Then, the standard deviation, S_n, is

$$S_n = [\Sigma_t(P_t - \mu)^2/(n-1)]^{1/2} \quad (1)$$

If P_t is subject to a linear trend, then $(P_t - \mu)$ is replaced by $(P_t - t)$ in (1) and becomes:

$$S_n = [\Sigma_t(P_t - t)^2/(n-1)]^{1/2} \quad (2)$$

These measures however, require that the variable under consideration is either stationary (when μ is used) or trend-stationary (when t is used).

In the case of non-stationarity (the most likely outcome for price series), one has to induce stationarity first and then calculate variability. Because non-stationary variables require taking first differences to induce stationarity, the measure of variability used is the Z-statistic. It is defined as:

$$S_n = [\Sigma_t(P_t - P_{t-1})^2/(n-1)]^{1/2} \quad (3)$$

Notice that when P_t is nonstationary (or alternatively $I(1)$), its first difference, $(P_t - P_{t-1})$, is stationary, $I(0)$, thus making the Z-statistic a proper measure of price variability.

Therefore, the first step in calculating price variability is to examine the stationarity properties of P_t. This is done by utilizing the testing procedures outlined in appendix B. The sample consists of monthly data from January 1960 to December 2002 (a total of 504 observations). The sample is divided into 3 periods consistent with the two structural changes that have taken place in the cotton market. The first period goes up to 1972 (prior to the commodity crisis of 1973). The second period goes up to 1985 (when the US changed its policy stance and released huge stocks of cotton). The third period covers 1985 to 2002. Because the MUV—the preferred deflator for dollar-denominated commodity prices—is not available on monthly basis, the US consumer and producer price indices were used instead.

Table C1 reports the stationarity test statistics for levels without trend (upper panel), levels with trend (middle panel) and first differences (lower panel), deflated by the producer price index (first 3 columns) and the consumer price index (right 3 columns). Results from the upper panel indicate that non-stationarity against the alternative of stationarity is not rejected (i.e. cotton prices are not stationary at levels). Results from the second panel indicate that, with the exception of PP test during the second period which indicates trend stationarity at the 10% level, in all other cases the null hypothesis of non-stationarity cannot be rejected. Thus, the prices have to be differenced once to become stationary.

Therefore, in order to calculate price variability, one must rely on the *Z*-statistic. However, for the sake of comparison, the upper panel of table C2 reports statistics for both variability around trend (first column, denoted "Trend") and the *Z*-statistic (second column denoted "First differences"). The third column (denoted "Annual average") reports the period average of the standard deviation for each crop year (i.e. first the standard deviation for each consecutive 12-month period is calculated, starting in August an then the average of these standard deviations over the three periods is calculated). This statistic, in a sense, is as a measure of short term variability.

The lower panel of table C2 gives the percentage change of price variability from one period to another. All three measures give the same qualitative outcome while there is no discernable difference when the producer or the consumer price index is considered. The main message from table C2 is that price variability during the post-1985 period has been 2.5 times higher of what it was during the pre-1973 period while it is about half of what it was during the 1973-84 period. Figures C1 and C2 depict the within year variability. In particular, figure C1 shows the variability for each year averaged over the three periods defined above—the averages are the ones reported in the last column of table C2, upper panel, 1.5, 7.5, 3.5, respectively. Figure C2 depicts the same numbers averaged differently. Specifically, the second period consists of only two years, the highly inflationary 1973 and 1974. Variability during the second and third period increases to 16.8 (from 7.5) and 4.2 (from 3.5), respectively.

TABLE C1: STATIONARITY STATISTICS

	Deflated by Producer Price Index		Deflated by Consumer Price Index	
	ADF	PP	ADF	PP
Levels				
1960-72	-2.38	-2.21	-1.90	-2.00
1973-84	-3.40*	-2.63	-2.48	-3.37*
1985-2002	-2.53	-2.91	-2.67	-2.46
Trend				
1960-72	-2.76	-2.63	-2.07	-2.02
1973-84	-4.25**	-3.18*	-4.57***	-3.44**
1985-2002	-2.69	-2.84	-2.06	-2.46
First Differences				
1960-72	-4.40***	-10.20***	-5.32***	-8.31***
1973-84	-3.83**	-11.03***	-3.87**	-6.39***
1985-2002	-6.31***	-9.01***	-6.12***	-7.78***

Notes: ADF and PP denotes the Augmented Dickey-Fuller and Phillips-Perron statistics. The McKinnon critical values (properly adjusted for the number of observations) are: -4.00 (1%), -3.44 (5%), and –3.13 (10%). Asterisks denote rejection of the null hypothesis of non-stationarity at the 1% (***), 5% (**) and 10% (*) levels of significance.

TABLE C2: PRICE VARIABILITY MEASURES

	Deflated by Producer Price Index			Deflated by Consumer Price Index		
	Trend[a]	First differences[b]	Annual average[c]	Trend[a]	First differences[b]	Annual average[c]
Measure of Variability						
1960-72	11.7	3.7	4.8	3.8	1.2	1.5
1973-84	39.6	12.8	19.7	13.8	4.6	7.0
1985-2002	25.7	7.0	12.1	7.7	2.0	3.5
Change (percent)						
1960-72 to 1973-84	238%	250%	309%	268%	279%	368%
1960-72 to 1985-2002	120%	90%	151%	105%	66%	133%
1973-84 to 1985-2002	-35%	-46%	-39%	-44%	-56%	-50%

a. Variation around the trend for each period—equation (2).
b. Variability around the average of the first differences of each period—equation (3)
c. Variability around the average of each crop year (August-July) for each period; each period consists of 12 observations—period average of equation (1).
Source: Authors' calculations.

Figure C1: Monthly Cotton Price Variability

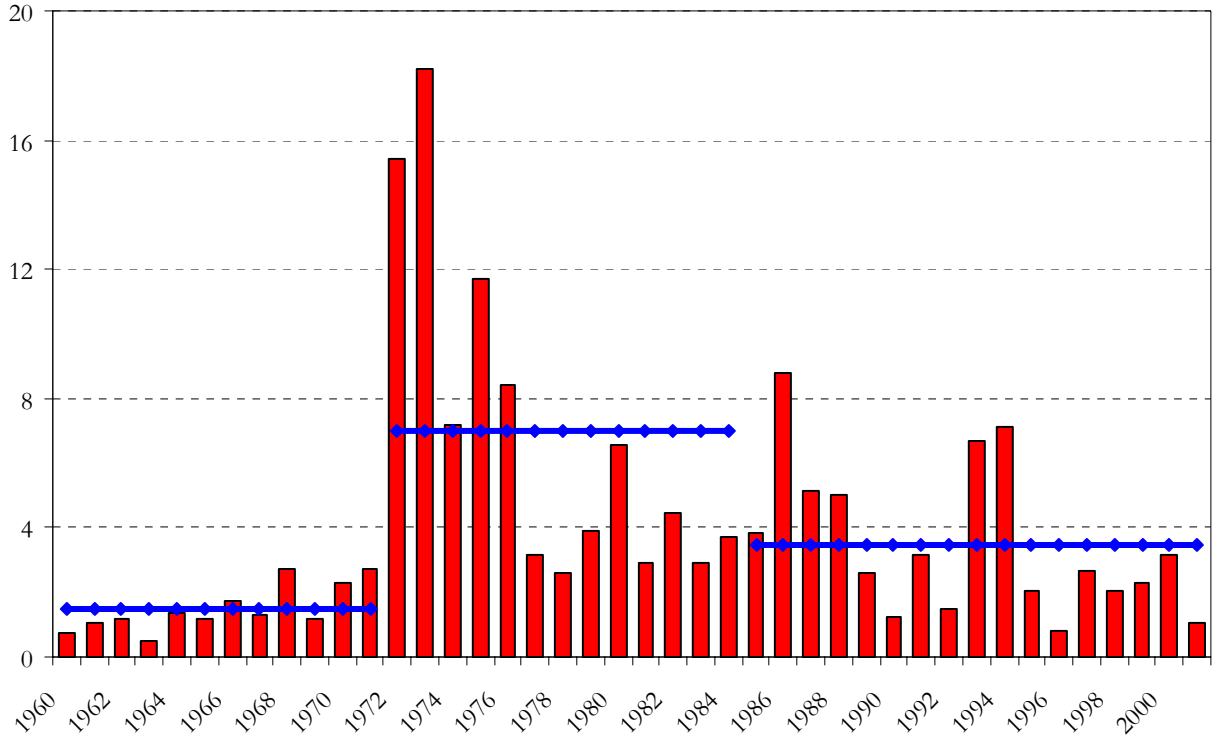
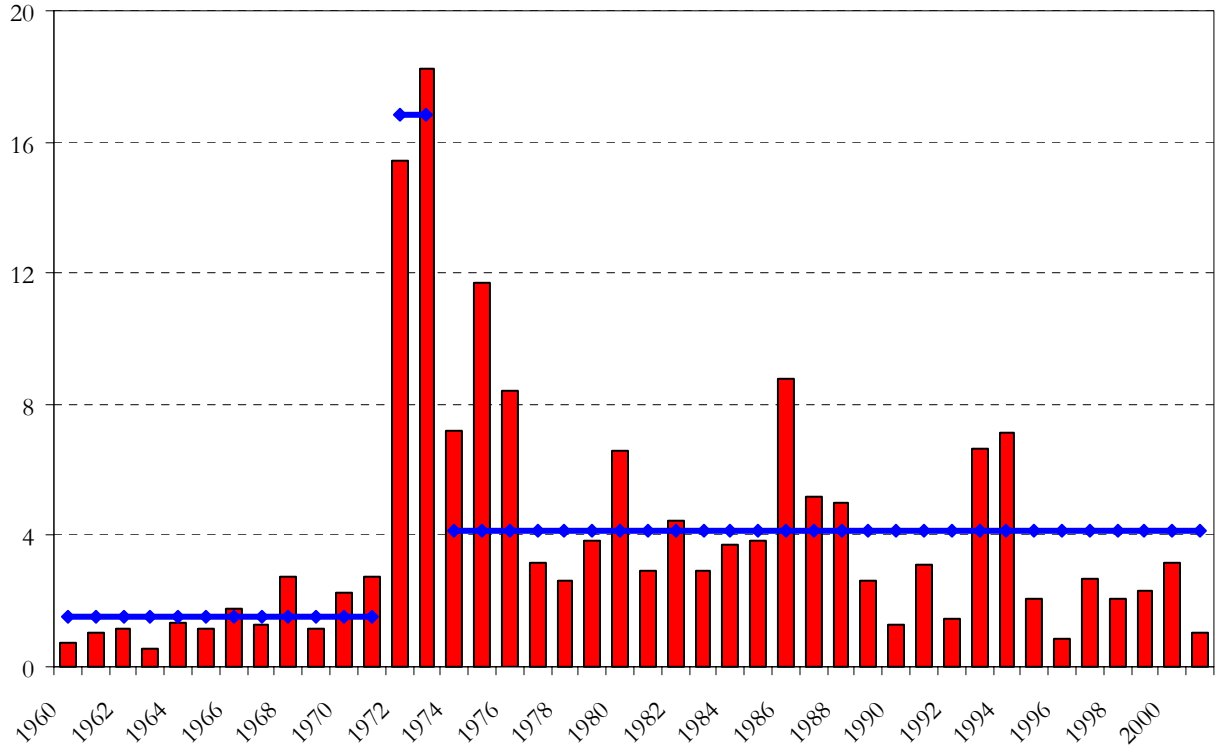


Figure C2: Monthly Cotton Price Variability



APPENDIX D: THE COTLOOK A AND B INDICES

The Cotlook A Index is the average of the 5 lowest quotations of 16 styles of cotton (Middling 1-3/32'') traded in North European ports from the following origins: Australia, Brazil, China, Francophone Africa, Greece, India, Mexico, Pakistan, Paraguay, Spain, Syria, Tanzania, Turkey, the United States, and Uzbekistan. The Cotlook B Index is the average of the three lowest quotations of eight styles of coarser grades of cotton from Argentina, Brazil, China, India, Pakistan, Turkey, the United States, and Uzbekistan.

The indices are compiled daily by Cotton Outlook, a private company located in Liverpool, UK. Staff collect quotations by interviewing cotton traders and merchants in North Europe, and they also look at other market developments likely to affect cotton prices. These offering prices and the day's indices are published at about 2:30 p.m. UK time.

The prices are expressed in U.S. cents per pound, c.i.f. North Europe, cash against documents on arrival of vessel, including profit and agent's commission. When a particular cotton growth is not offered in large volume, the quotation is still reported, but it is not eligible to participate in the index. The index is based on the three or five least expensive quotations because quotations reflect offering prices, not the level at which business has been arranged, so a buyer would normally expect to succeed with bids that are slightly lower than quoted.

The quotations represent nearby delivery, normally between two and four months. A dual quotation is reported when information on supply conditions of the next cotton season is readily available: one for nearby delivery and one for forward delivery. For example, quotations on July 12, 2001 referred to July/August 2001 delivery (nearby) and October 2001 to May 2002 delivery (forward). Table D1 depicts the composition of the Cotlook A and B Indices for three randomly selected dates: July 12 (nearby and forward delivery), August 30 (nearby delivery), and October 18, 2001 (nearby delivery).

Because the US quotations are among the highest, they are included in the A Index very infrequently. On the contrary, the Francophone Africa quotation is included very often in the Index because the quotation is relatively low (and hence the chances of its eligibility high) and it also traded throughout the entire season.

TABLE D1

COMPOSITION OF THE COTLOOK A AND B INDICES (US CENTS PER POUND)

ORIGIN	JULY 12, 2001 (NEARBY)	JULY 12, 2001 (FORWARD)	AUGUST 30, 2001 (NEARBY)	OCTOBER 18, 2001 (NEARBY)
Australia	50.00	52.25	51.50	44.25
Brazil	46.50	46.00*	43.00*	NQ
China	NQ	NQ	NQ	NQ
Franc Zone	47.00*	45.50*	43.25	38.00*
Greece	44.00*	44.75*	42.00*	35.25*
India	NQ	NQ	NQ	NQ
Mexico	NQ	NQ	NQ	NQ
Pakistan	NQ	NQ	NQ	NQ
Paraguay	45.00*	NQ	NQ	NQ
Spain	49.50	46.00*	43.00*	38.25*
Syria	47.00*	46.50	42.00*	36.00*
Tanzania	NQ	49.00	47.00	NQ
Turkey	NQ	NQ	NQ	NQ
US (California/Arizona)	50.50	53.75	50.50	42.25
US (Memphis/Eastern)	52.00	53.00	49.75	40.50
Uzbekistan	47.00*	45.50*	42.50*	36.00*
A Index	**46.00**	**45.55**	**42.50**	**36.70**
Argentina	45.50@	NQ	NQ	NQ
Brazil	NQ	43.50@	40.50@	37.00
China	NQ	NQ	NQ	NQ
India	NQ	NQ	NQ	NQ
Pakistan	NQ	44.50@	41.50	33.50@
Turkey	NQ	NQ	NQ	NQ
US (Orleans/Texas)	43.00@	45.00	41.25@	34.00@
Uzbekistan	45.00@	44.00@	41.00@	34.50@
B Index	**44.50**	**44.00**	**40.90**	**34.00**

NQ no quotation from this origin available that week.

* quotation is one of the five less expensive origins.

@ quotation is one of the three less expensive origins.

Source: *Cotton Outlook*, July 13, August 31, and October 19, 2001 issues.

APPENDIX E: COTTON PRICE RISK MANAGEMENT

Cotton was one of the first commodities to be traded in futures markets. Earlier in the 20th century there were at least 10 active cotton futures exchanges (Baffes and Kaltsas 2002). Currently, there is only one major cotton futures and options contract, which is traded at the New York Board of Trade. The New York contract, whose size is 50,000 pounds, uses Memphis No. 2 cotton as the cash price equivalent for quality specification and delivery purposes. There are five delivery months (March, May, July, October, and December), and the nearest 10 delivery months are available for trade, extending the time span of the contract to almost two years—a July 2001 contract could be traded as early as August 1999. Table E1 reports the closing futures prices for the March, May, and July 2002 contracts on January 3, 11, and 13, 2002. It also reports the strike prices and costs for the corresponding put options.

The New York contract is appropriate only for U.S. cotton, however. Non-U.S. cotton traders and merchants have no access to a hedging instrument. *Cotton Outlook* (December 12, 1997, p. 3) observed that the lack of an international trading instrument—one that consistently reflects broad world cotton market developments but is capable of being used as hedge—continues to be a shortcoming of the current pricing system. The 59th ICAC Plenary Meeting in Cairns reached a similar conclusion (ICAC 2001):

> *Futures contracts traded in New York are limited to the delivery of U.S. cotton to U.S. locations. Accordingly, prices in New York reflect primarily U.S. conditions. As a consequence, prices for cotton in non-U.S. locations can diverge from New York futures prices, limiting the utility of the New York market for many in the world industry.*

Comovement between the New York contract and the Cotlook A Index is low, confirming the inadequacy of the New York contract as a hedging tool for traders and merchants of non-U.S. types of cotton. As an example, in December 31, 1990, the May 1991 New York contract closed at 76.19 cents a pound, 8.21 cents below the Cotlook A Index, and it expired on May 8, 1991, at 92.22 cents a pound, 8.92 cents above the Cotlook A Index. In a study using an error-correction specification and weekly cotton prices (components of the A Index) from August 1985 to December 1987 and August 1995 to January 1997, Baffes and Ajwad (2001) found that, unlike Central Asian, West African, and (to some extent) Greek prices, U.S. prices moved relatively independently of other prices.

Several efforts have been made since the late 1990s to establish an international trading instrument for cotton (Baffes and Kaltsas 2002). Brazil reintroduced its cotton contract in 1996 and India in 1998. China, Euronext (the European Trading Alliance), Turkey, and the United States are also contemplating new initiatives. The Cotton Exchanges in Brazil and India are not used by foreign traders, but the one in Europe, if launched, is expected to trade Central Asian and West African cotton, making it a use-

ful hedging tool for traders and merchants of non-U.S. cotton. The Common Fund for Commodities has recently launched a project investigating ways to manage cotton price risk in Tanzania, Uganda, and Zimbabwe, with the Cotton Company of Zimbabwe as the project executing agency.

TABLE E1: INDICATIVE COTTON FUTURES AND PUT OPTIONS STRIKE PRICES AND COSTS (CENTS PER POUND)

	MARCH 2002	MAY 2002	JULY 2002
JANUARY 3, 2002		CLOSING FUTURES PRICE	
	36.46	37.90	39.30
STRIKE PRICE		COST OF PUT OPTION	
38.00	2.44	2.58	2.50
36.00	1.29	1.64	1.70
34.00	0.56	0.95	1.10
JANUARY 11, 2002		CLOSING FUTURES PRICE	
	37.40	38.88	40.40
STRIKE PRICE		COST OF PUT OPTION	
40.00	3.15	3.15	2.69
38.00	1.75	2.08	2.04
36.00	0.83	1.26	1.33
35.00	0.53	0.95	1.04
JANUARY 13, 2002		CLOSING FUTURES PRICE	
	36.80	38.30	39.80
STRIKE PRICE		COST OF PUT OPTION	
40.00	3.43	3.32	3.20
38.00	1.84	2.18	2.22
36.00	0.75	1.30	1.45

Source: The New York Board of Trade

APPENDIX F: STATISTICAL TABLES

TABLE F1: PROFILE OF COTTON: 1998/99

COUNTRY	PRODUCTION (thousand tons)	EXPORTS (thousand tons)	YIELD (kilograms per hectare)	PER CAPITA GDP (1995 US dollars)
AMERICAS				
United States	3,362	1,208	699	30,620
Brazil	611	4	800	4,495
Mexico	177	42	691	3,583
Argentina	167	162	364	8,270
Paraguay	74	60	442	1,768
Peru	46	5	631	2,344
Total	**4,489**	**1,490**		
AFRICA				
Egypt	232	103	776	1,166
Mali	207	209	419	285
Côte d'Ivoire	165	145	585	782
Benin	138	135	360	398
Zimbabwe	117	96	343	674
Burkina Faso	115	112	392	249
Cameroon	79	71	459	655
Chad	69	67	230	224
Togo	68	69	435	341
Nigeria	58	18	199	252
Sudan	54	51	398	290
South Africa	42	9	369	3,946
Tanzania	39	30	186	185
Total	**1,556**	**1,228**		
EUROPE				
Greece	396	275	934	12,400
Spain	118	58	1,143	16,802
Total	**514**	**384**		
ASIA				
China	4,165	258	1,044	747
India	2,729	27	306	438
Pakistan	1,703	46	576	503
Uzbekistan	1,064	897	700	467
Turkey	831	65	1,127	3,072
Australia	734	678	1,332	23,293
Syria	321	226	1,409	858
Turkmenistan	208	195	378	1,126
Iran	141	0	641	1,580
Tajikistan	104	87	413	352
Kazakhstan	67	64	572	1,350
Myanmar	54	27	216	—
Israel	38	38	1,660	16,453
Total	**12,349**	**2,703**		
WORLD	**18,907**	**5,805**	**585**	

Source. International Cotton Advisory Committee and World Bank (World Development Indicators).

TABLE F2

GLOBAL BALANCE OF THE COTTON MARKET (THOUSAND TONS), 1960-2002

	1960	*1970*	*1980*	*1990*	*1998*	*1999*	*2000*	*2001*	*2002*
PRODUCTION									
China	1,372	1,995	2,707	4,508	4,501	3,830	4,350	5,100	4,700
US	3,147	2,219	2,422	3,376	3,030	3,835	3,818	4,393	3,879
India	1,012	909	1,322	1,989	2,710	2,650	2,350	2,459	2,450
Pakistan	306	543	714	1,638	1,480	1,800	1,750	1,743	1,717
Uzbekistan[a]	1,491	2,342	2,661	2,593	1,000	1,150	960	1,055	1,035
Franc Zone	63	140	224	562	897	928	700	991	902
Turkey	192	400	500	655	871	826	740	900	900
Brazil	425	549	623	717	420	648	848	725	785
Australia	2	19	99	433	726	733	704	658	386
Greece	63	110	115	213	405	428	420	410	355
Egypt	480	509	529	296	230	229	206	279	293
Syria	112	150	118	145	335	325	362	350	233
World	**10,201**	**11,740**	**13,831**	**18,970**	**18,551**	**18,887**	**18,901**	**20,856**	**19,076**
ENDING STOCKS									
US	1,574	915	653	510	849	860	1,174	1,826	2,222
China	0	412	299	1,550	4,124	2,814	2,263	2,347	1,949
India	635	376	59	539	1,011	910	848	812	583
Brazil	144	321	391	231	317	370	505	536	401
Pakistan	52	55	204	313	353	463	353	616	373
Australia	5	13	61	150	424	431	371	378	348
World	**4,643**	**4,605**	**5,152**	**6,653**	**9,699**	**8,710**	**7,917**	**9,896**	**9,092**
CONSUMPTION									
China	1,481	2,016	3,300	4,225	4,400	4,800	5,050	5,500	5,700
India	1,006	1,076	1,371	1,958	2,781	2,939	2,924	2,899	2,942
Pakistan	245	429	461	1,343	1,625	1,700	1,760	1,900	2,000
US	1,803	1,786	1,083	1,885	2,265	2,230	1,929	1,681	1,578
Turkey	109	184	293	557	1,000	1,200	1,150	1,300	1,365
Brazil	272	296	566	723	797	852	871	860	875
Indonesia	10	43	104	336	438	470	480	530	500
Mexico	109	146	165	170	484	525	435	430	418
Thailand	15	65	127	328	290	340	360	385	400
Russia[a]	1,350	1,821	1,796	1,190	190	280	320	345	362
Korea	59	117	322	436	320	325	320	325	330
Italy	226	201	209	333	284	307	300	290	284
Taiwan	46	137	229	346	290	295	250	260	260
Bangladesh[b]	na	na	45	98	153	169	196	215	240
Uzbekistan[a]	na	na	na	205	125	185	220	250	225
Japan	739	766	715	650	275	280	251	221	212
World	**10,231**	**12,173**	**14,215**	**18,585**	**18,674**	**19,756**	**19,753**	**20,152**	**20,535**

a. Uzbekistan and Russia refer to USSR prior to and including 1990.

b. Included in Pakistan prior to 1970 and including 1970.

Source: ICAC, *Cotton: Review of the World Situation*, various issues.

TABLE F3

GLOBAL TRADE OF THE COTTON MARKET (THOUSAND TONS), 1960-2002

	1960	*1970*	*1980*	*1990*	*1998*	*1999*	*2000*	*2001*	*2002*
EXPORTS									
US	1,444	848	1,290	1,697	915	1,481	1,470	2,134	2,056
Uzbekistan[a]	381	553	616	397	900	900	820	718	717
Australia	0	4	53	329	650	710	720	650	609
Greece	33	0	13	86	230	294	293	257	249
Mali	2	19	35	114	216	201	125	126	221
Syria	97	134	71	91	210	180	245	220	171
Benin	1	14	8	58	119	151	131	132	164
Burkina Faso	0	9	22	73	117	106	107	127	154
Tajikistan[a]	na	na	na	200	90	83	110	120	147
Côte d'Ivoire	0	7	42	81	130	160	150	115	137
Zimbabwe	0	32	55	38	89	121	128	67	105
World	**3,667**	**3,875**	**4,414**	**5,081**	**5,274**	**6,054**	**5,875**	**6,167**	**6,377**
IMPORTS									
Indonesia	7	36	106	324	500	455	520	559	537
India	204	155	0	0	136	200	340	425	509
China	65	108	773	480	78	30	52	102	400
Turkey	0	1	0	46	250	459	285	385	358
Thailand	4	46	86	354	271	302	360	387	356
Mexico	0	1	0	43	302	436	473	396	352
Russia[a]	0	238	28	37	179	284	325	341	338
Italy	218	178	193	336	330	365	310	323	315
Korea, Rep.	51	121	332	447	330	350	315	318	298
Japan	800	796	697	634	270	276	242	247	240
Pakistan	1	1	1	0	192	103	101	280	224
Taiwan	47	160	214	358	293	322	269	225	214
Brazil	0	4	2	108	296	340	131	57	200
World	**3,804**	**4,086**	**4,555**	**5,222**	**5,429**	**5,811**	**5,875**	**6,167**	**6,377**

a. Uzbekistan, Tajikistan, and Russia refer to USSR prior to and including 1990.

Source: ICAC, *Cotton: Review of the World Situation*, various issues.

TABLE F4

DIRECTION OF COTTON TRADE: 1980/81-2000/01

	1980/81	*1990/91*	*2000/01*
Million of $ US (Current)			
Industrial to Industrial Countries	1,287	1,631	726
Industrial to Developing Countries	1,728	2,114	2,800
Developing to Industrial Countries	951	1,232	898
Developing to Developing Countries	599	1,896	1,951
TOTAL	**4,466**	**6,872**	**6,375**
Share (percent)			
Industrial to Industrial Countries	28	23	11
Industrial to Developing Countries	38	31	44
Developing to Industrial Countries	21	18	14
Developing to Developing Countries	13	28	31
TOTAL	**100**	**100**	**100**

a. Industrial countries are: US, EU (Greece and Spain), Australia, and Israel, currently accounting for 40 percent of world exports (2.3 million tons out of 5.8 million tons).

Source: COMTRADE

TABLE F5: COTTON PRICES[a] (US DOLLARS PER KILOGRAM), 1950-2002

	MONTHLY												ANNUAL	
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	NOMINAL	REAL[b]
1950													0.92	5.05
1951								0.86	0.88	0.94	1.04	1.08	0.96	4.56
1952	1.05	1.02	0.96	0.96	0.90	0.92	0.94	0.99	1.00	0.93	0.90	0.86	0.95	4.31
1953	0.82	0.83	0.83	0.83	0.38	0.82	0.84	0.83	0.82	0.83	0.83	0.84	0.83	3.87
1954	0.86	0.82	0.85	0.85	0.85	0.84	0.83	0.85	0.89	0.88	0.87	0.88	0.86	4.10
1955	0.88	0.88	0.85	0.84	0.85	0.85	0.83	0.82	0.78	0.76	0.77	0.75	0.82	3.84
1956	0.77	0.82	0.84	0.82	0.75	0.71	0.68	0.68	0.68	0.70	0.72	0.73	0.74	3.34
1957	0.74	0.74	0.75	0.74	0.72	0.72	0.72	0.74	0.73	0.74	0.77	0.78	0.74	3.28
1958	0.79	0.76	0.74	0.75	0.75	0.72	0.68	0.68	0.66	0.68	0.66	0.63	0.71	3.09
1959	0.63	0.62	0.62	0.63	0.62	0.62	0.61	0.62	0.63	0.63	0.64	0.66	0.63	2.78
1960	0.65	0.65	0.65	0.64	0.65	0.66	0.66	0.65	0.66	0.67	0.67	0.66	0.65	2.81
1961	0.66	0.68	0.67	0.67	0.68	0.68	0.68	0.67	0.67	0.68	0.66	0.66	0.67	2.85
1962	0.66	0.66	0.66	0.66	0.66	0.66	0.65	0.64	0.63	0.63	0.63	0.65	0.65	2.73
1963	0.66	0.65	0.65	0.64	0.64	0.64	0.64	0.64	0.65	0.65	0.64	0.64	0.65	2.71
1964	0.66	0.66	0.65	0.65	0.66	0.66	0.65	0.64	0.65	0.65	0.64	0.64	0.65	2.68
1965	0.64	0.67	0.65	0.65	0.65	0.63	0.63	0.63	0.63	0.62	0.62	0.62	0.64	2.59
1966	0.62	0.62	0.64	0.62	0.62	0.62	0.62	0.62	0.61	0.63	0.63	0.63	0.62	2.42
1967	0.64	0.66	0.66	0.66	0.66	0.67	0.67	0.68	0.69	0.70	0.71	0.72	0.68	2.57
1968	0.72	0.71	0.71	0.71	0.71	0.70	0.69	0.68	0.66	0.66	0.63	0.62	0.68	2.68
1969	0.63	0.63	0.63	0.63	0.63	0.62	0.61	0.60	0.61	0.63	0.65	0.66	0.63	2.31
1970	0.64	0.65	0.66	0.66	0.66	0.67	0.67	0.68	0.69	0.70	0.71	0.72	0.63	2.25
1971	0.73	0.74	0.73	0.73	0.75	0.79	0.80	0.83	0.83	0.82	0.82	0.85	0.74	2.51
1972	0.89	0.90	0.87	0.87	0.86	0.83	0.78	0.74	0.73	0.78	0.81	0.86	0.79	2.46
1973	0.89	0.91	0.96	1.03	1.15	1.22	1.46	1.67	1.91	1.93	1.75	1.82	1.36	3.63
1974	1.99	1.84	1.69	1.61	1.47	1.40	1.32	1.33	1.32	1.26	1.17	1.09	1.42	3.11
1975	1.05	1.06	1.09	1.16	1.22	1.23	1.25	1.31	1.33	1.32	1.30	1.35	1.16	2.30
1976	1.47	1.52	1.54	1.56	1.61	1.80	2.00	1.92	1.88	1.92	1.91	1.84	1.69	3.31
1977	1.75	1.86	1.92	1.89	1.78	1.61	1.57	1.51	1.43	1.39	1.41	1.42	1.55	2.81
1978	1.46	1.53	1.58	1.60	1.63	1.60	1.55	1.59	1.63	1.67	1.73	1.71	1.57	2.45
1979	1.68	1.67	1.69	1.64	1.68	1.70	1.70	1.71	1.72	1.72	1.77	1.82	1.69	2.36

TABLE F5: COTTON PRICES[a] (US DOLLARS PER KILOGRAM), 1950-2002 (continued)

	MONTHLY												ANNUAL	
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	NOMINAL	REAL[b]
1980	1.94	2.13	2.06	1.99	1.95	1.85	1.94	2.11	2.22	2.18	2.16	2.18	2.05	2.60
1981	2.18	2.12	2.04	1.98	1.95	1.93	1.89	1.77	1.70	1.67	1.65	1.58	1.85	2.34
1982	1.55	1.54	1.55	1.58	1.69	1.67	1.73	1.66	1.60	1.55	1.52	1.54	1.60	2.09
1983	1.58	1.64	1.74	1.77	1.81	1.90	1.95	2.00	1.98	1.94	1.97	1.97	1.85	2.49
1984	1.93	1.93	1.95	1.96	1.97	1.85	1.74	1.66	1.61	1.62	1.60	1.59	1.79	2.45
1985	1.57	1.51	1.48	1.46	1.43	1.39	1.34	1.26	1.18	1.08	1.06	1.06	1.32	1.83
1986	1.14	1.20	1.15	1.07	1.00	0.90	0.83	0.82	0.96	1.13	1.16	1.30	1.06	1.27
1987	1.45	1.45	1.39	1.46	1.69	1.75	1.84	1.91	1.84	1.68	1.67	1.66	1.65	1.81
1988	1.59	1.49	1.46	1.45	1.45	1.52	1.40	1.27	1.25	1.27	1.29	1.35	1.40	1.45
1989	1.39	1.39	1.46	1.63	1.71	1.74	1.83	1.83	1.80	1.81	1.81	1.71	1.67	1.74
1990	1.66	1.68	1.74	1.83	1.89	1.99	2.01	1.79	1.79	1.79	1.82	1.85	1.82	1.82
1991	1.85	1.87	1.86	1.83	1.82	1.78	1.70	1.62	1.55	1.50	1.40	1.36	1.68	1.64
1992	1.31	1.24	1.22	1.28	1.34	1.41	1.44	1.32	1.25	1.17	1.16	1.20	1.28	1.21
1993	1.26	1.33	1.36	1.35	1.33	1.30	1.27	1.22	1.22	1.21	1.21	1.31	1.28	1.20
1994	1.53	1.78	1.80	1.85	1.90	1.89	1.80	1.69	1.66	1.63	1.71	1.92	1.76	1.60
1995	2.11	2.23	2.44	2.51	2.53	2.00	1.93	1.88	2.01	2.01	1.97	1.94	2.13	1.82
1996	1.90	1.87	1.83	1.83	1.83	1.83	1.76	1.68	1.66	1.66	1.68	1.75	1.77	1.59
1997	1.76	1.77	1.78	1.74	1.75	1.78	1.79	1.79	1.76	1.72	1.70	1.64	1.75	1.69
1998	1.59	1.52	1.51	1.45	1.42	1.52	1.54	1.50	1.46	1.36	1.24	1.23	1.44	1.45
1999	1.23	1.24	1.25	1.27	1.32	1.29	1.20	1.12	1.09	1.05	1.02	0.97	1.17	1.18
2000	1.05	1.18	1.26	1.29	1.33	1.31	1.29	1.34	1.36	1.34	1.41	1.45	1.30	1.34
2001	1.41	1.33	1.20	1.13	1.10	1.05	1.00	0.96	0.91	0.82	0.84	0.95	1.06	1.12
2002	0.96	0.94	0.93	0.91	0.88	0.96	1.03	1.09	1.08	1.09	1.15	1.22	1.02	1.09
2003	1.25	1.30	1.35	1.34	1.28	1.29	1.33	1.34	1.41	1.60	1.70	1.62	1.40	1.40

a. Mexican c.i.f. North Europe up to July 1973; A Index since August 1973.

b. Real prices have been deflated by the manufacture import unit value (1990 = 1.0).

Source: World Bank *Commodity Price Data*.

TABLE F6: PRODUCTION OF CHEMICAL FIBERS (THOUSAND TONS) 1975-2000

COUNTRY	1975	1980	1985	1990	1995	2000
China (Mainland)	156	418	912	1,557	2,719	6,711
European Union	2,450	2,694	2,816	2,781	2,713	3,429
United States	2,785	3,609	3,117	3,115	3,465	3,308
China (Taiwan)	284	636	1,145	1,769	2,550	3,264
Korea, Rep.	273	564	825	1,286	1,865	2,665
India	155	203	335	653	1,000	1,866
Japan	1,380	1,755	1,747	1,701	1,613	1,434
Indonesia	8	96	187	323	820	1,261
Thailand	39	103	111	203	539	822
Turkey	51	104	194	305	464	747
Mexico	185	267	326	370	530	602
Pakistan	5	4	42	75	258	504
Malaysia	3	36	39	42	61	414
Brazil	175	283	269	262	281	347
Americas	*3,415*	*4,488*	*4,074*	*4,452*	*4,702*	*4,660*
Africa	*36*	*77*	*143*	*166*	*235*	*245*
Europe	*4,443*	*5,143*	*5,590*	*5,579*	*3,797*	*3,429*
Asia	*2,421*	*4,010*	*5,668*	*7,293*	*12,064*	*19,999*
World[a]	**10,314**	**13,718**	**15,475**	**17,672**	**20,797**	**28,335**

a. World denotes the world total which includes countries not listed here.

Source. International Cotton Advisory Committee.

TABLE F7: GLOBAL FIBER CONSUMPTION, 1960-2002

	CONSUMPTION (THOUSAND TONS)				SHARE (PERCENT)		
YEAR	TOTAL	COTTON	WOOL	CHEMICAL	COTTON	WOOL	CHEMICAL
1960	15,153	10,356	1,495	3,302	68.3	9.9	21.8
1961	15,102	10,085	1,505	3,512	66.8	10.0	23.3
1962	15,339	9,902	1,501	3,936	64.6	9.8	25.7
1963	16,003	10,147	1,475	4,381	63.4	9.2	27.4
1964	17,256	10,830	1,460	4,966	62.8	8.5	28.8
1965	18,182	11,318	1,473	5,391	62.2	8.1	29.7
1966	18,796	11,539	1,545	5,712	61.4	8.2	30.4
1967	19,212	11,695	1,473	6,044	60.9	7.7	31.5
1968	20,434	11,763	1,565	7,106	57.6	7.7	34.8
1969	21,248	11,911	1,604	7,733	56.1	7.5	36.4
1970	22,041	12,405	1,500	8,136	56.3	6.8	36.9
1971	23,037	12,493	1,480	9,064	54.2	6.4	39.3
1972	24,417	12,903	1,578	9,936	52.8	6.5	40.7
1973	26,031	13,288	1,443	11,300	51.0	5.5	43.4
1974	25,267	12,986	1,262	11,019	51.4	5.0	43.6
1975	24,717	13,047	1,358	10,312	52.8	5.5	41.7
1976	26,537	13,211	1,515	11,811	49.8	5.7	44.5
1977	27,025	13,117	1,478	12,430	48.5	5.5	46.0
1978	28,246	13,415	1,481	13,350	47.5	5.2	47.3
1979	29,440	13,897	1,558	13,985	47.2	5.3	47.5
1980	29,580	14,295	1,567	13,718	48.3	5.3	46.4
1981	29,731	14,124	1,576	14,031	47.5	5.3	47.2
1982	28,895	14,248	1,556	13,091	49.3	5.4	45.3
1983	30,166	14,548	1,612	14,006	48.2	5.3	46.4
1984	31,251	14,830	1,621	14,800	47.5	5.2	47.4
1985	32,813	15,768	1,625	15,420	48.1	5.0	47.0
1986	34,956	17,462	1,708	15,786	50.0	4.9	45.2
1987	36,546	18,226	1,754	16,566	49.9	4.8	45.3
1988	37,427	18,210	1,904	17,313	48.7	5.1	46.3
1989	38,228	18,677	1,861	17,690	48.9	4.9	46.3
1990	37,882	18,602	1,628	17,652	49.1	4.3	46.6
1991	38,070	18,563	1,801	17,706	48.8	4.7	46.5
1992	38,872	18,628	1,757	18,488	47.9	4.5	47.6
1993	39,109	18,544	1,649	18,916	47.4	4.2	48.4
1994	40,392	18,427	1,723	20,242	45.6	4.3	50.1
1995	40,792	18,425	1,554	20,813	45.2	3.8	51.0
1996	42,296	18,821	1,440	22,035	44.5	3.4	52.1
1997	45,086	19,059	1,361	24,666	42.3	3.0	54.7
1998	45,481	18,707	1,293	25,481	41.1	2.8	56.0
1999	47,071	19,162	1,350	26,559	40.7	2.9	56.4
2000	49,416	19,791	1,281	28,344	40.0	2.6	57.4
2001	49,603	20,080	1,401	28,122	40.5	2.8	56.7
2002	50,021	20,656	1,357	30,008	39.7	2.6	57.7

Source. International Cotton Advisory Committee.

TABLE F8: FIBER PRICES (US $ PER KILOGRAM), 1960-2002

	NOMINAL					REAL			
Year	A Index	Wool	Rayon	Polyester	MUV[a]	A Index	Wool	Rayon	Polyester
1960	0.65	1.34	0.62	2.78	0.23	2.81	5.81	2.67	12.01
1961	0.67	1.39	0.57	2.60	0.24	2.85	5.91	2.43	11.03
1962	0.65	1.22	0.57	2.51	0.24	2.73	5.09	2.39	10.46
1963	0.65	1.43	0.60	2.51	0.24	2.71	6.05	2.52	10.66
1964	0.65	1.51	0.62	2.16	0.24	2.68	6.30	2.58	9.04
1965	0.64	1.26	0.60	1.85	0.24	2.59	5.22	2.47	7.67
1966	0.62	1.36	0.57	1.79	0.25	2.42	5.45	2.29	7.14
1967	0.68	1.22	0.53	1.28	0.25	2.57	4.83	2.09	5.06
1968	0.68	1.17	0.55	1.21	0.25	2.68	4.66	2.20	4.85
1969	0.63	1.32	0.57	0.99	0.26	2.31	5.00	2.17	3.76
1970	0.63	0.98	0.55	0.90	0.28	2.25	3.50	1.96	3.22
1971	0.74	0.80	0.60	0.84	0.29	2.51	2.70	2.02	2.84
1972	0.79	1.18	0.68	0.79	0.32	2.46	3.66	2.12	2.47
1973	1.36	3.05	0.73	0.84	0.37	3.63	8.18	1.95	2.25
1974	1.42	2.52	1.12	1.01	0.45	3.11	5.54	2.47	2.23
1975	1.16	1.82	1.12	1.10	0.51	2.30	3.61	2.23	2.18
1976	1.69	1.98	1.19	1.19	0.51	3.31	3.87	2.33	2.33
1977	1.55	2.27	1.32	1.23	0.55	2.81	4.11	2.39	2.23
1978	1.57	2.35	1.28	1.19	0.64	2.45	3.66	1.99	1.85
1979	1.69	2.55	1.43	1.30	0.72	2.36	3.55	2.00	1.82
1980	2.05	3.02	1.63	1.61	0.79	2.60	3.84	2.07	2.04
1981	1.85	3.28	1.90	1.74	0.79	2.34	4.16	2.40	2.21
1982	1.60	3.07	1.85	1.69	0.77	2.09	4.01	2.42	2.21
1983	1.85	2.70	1.76	1.61	0.74	2.49	3.62	2.37	2.16
1984	1.79	2.81	1.85	1.74	0.73	2.45	3.86	2.54	2.39
1985	1.32	2.59	1.74	1.46	0.72	1.83	3.59	2.41	2.03
1986	1.06	2.38	1.67	1.37	0.83	1.27	2.87	2.01	1.66
1987	1.65	3.44	1.79	1.47	0.91	1.81	3.78	1.97	1.61
1988	1.40	5.67	2.00	1.63	0.97	1.45	5.86	2.07	1.68
1989	1.67	5.21	2.42	1.91	0.96	1.74	5.41	2.52	1.98
1990	1.82	4.47	2.64	1.83	1.00	1.82	4.47	2.64	1.83
1991	1.68	3.08	2.69	1.62	1.02	1.64	3.02	2.64	1.59
1992	1.28	3.03	2.52	1.62	1.06	1.21	2.86	2.37	1.53
1993	1.28	2.40	2.46	1.60	1.07	1.20	2.25	2.30	1.50
1994	1.76	3.23	2.27	1.65	1.11	1.60	2.92	2.06	1.50
1995	2.13	3.96	2.62	1.96	1.17	1.82	3.38	2.24	1.67
1996	1.77	3.26	2.59	1.75	1.11	1.59	2.94	2.33	1.58
1997	1.75	3.59	2.54	1.51	1.03	1.69	3.49	2.45	1.46
1998	1.44	2.75	2.42	1.34	1.00	1.45	2.75	2.43	1.34
1999	1.17	2.38	2.17	1.14	0.99	1.18	2.40	2.19	1.15
2000	1.30	3.53	2.15	1.26	0.97	1.34	3.64	2.21	1.29
2001	1.06	2.60	2.17	1.33	0.96	1.14	2.71	2.26	1.39
2002	1.02	3.72	2.16	1.32	0.96	1.04	3.88	2.24	1.37

a. Denotes the deflator, Manufactures Import Unit Value (1990 = 1.0).

Source. World Bank (A Index and MUV) and International Cotton Advisory Committee.

TABLE F9

VALUE OF EXPORTS OF OLD CLOTHING (MILLION US DOLLARS): 1975-2000

COUNTRY	1980/81	1985/86	1990/91	1995/96	2000/01
Industrial to Developing Countries					
United States	81.0	81.1	116.6	227.3	188.5
Germany	8.8	14.9	36.0	103.5	123.0
United Kingdom	3.5	8.1	20.8	71.4	92.4
Belgium	28.7	35.9	64.9	97.9	70.8
Netherlands	21.3	22.6	42.0	69.8	69.6
Italy	1.5	3.4	28.3	57.1	52.7
Japan	20.7	27.6	40.8	49.9	46.5
Canada	2.5	4.8	11.0	43.0	39.0
France	7.2	8.0	19.4	29.9	31.9
Australia	5.2	5.1	7.6	19.1	13.4
Switzerland	0.1	0.2	0.7	6.0	9.8
Sweden	2.2	1.1	4.2	5.9	7.8
ALL	**185.9**	**217.2**	**399.2**	**795.4**	**765.1**
Industrial to Industrial Countries					
ALL	**223.0**	**218.4**	**262.1**	**393.5**	**247.9**
Developing to Developing Countries					
ALL	**8.9**	**11.0**	**49.3**	**159.4**	**220.1**
Developing to Industrial Countries					
ALL	**5.0**	**10.5**	**24.3**	**127.7**	**163.6**
WORLD	**422.7**	**457.2**	**734.9**	**1,476.0**	**1,396.8**

Source. COMTRADE.

Notes: The 4-digit SITC code is 2690 and is defined as "Old clothing and other old textile articles; rags." The two 5-digit SITC codes (26901 and 26902) are defined as: "Clothing, cloth accessories, travel rugs & blankets" and "used or new rags, scrap twine, cordage, rope & cables." The 26901 code share of the 2690 code for the five two-year periods reported in the table are: 22.6%, 45.2%, 55.9%, 66.5%, 75.2%, and 80.7%.

TABLE F10

A CHRONOLOGY OF THE US COMMODITY PROGRAMS WITH COTTON PROVISIONS

PROGRAM	YEAR	MAIN PROVISIONS
Agricultural Marketing Act	1929	This Act was the first comprehensive program with the objective to stabilize commodity prices and farm income. It created the Federal Farm Board, which made loans to marketing cooperatives for the purchase and storage of surplus commodities, including cotton.
Agricultural Adjustment Act	1933	Aimed to control production and increase prices of designated "basic" commodities, including cotton to be achieved by restoring farm purchasing power to its 1910-14 average level, a concept which became known as "parity." In response to low prices during 1933, the "non-recourse" loans (a form of floor price) were introduced. Marketing quotas were also legislated in 1934 to prevent non-participants in the acreage control program from sharing its financial benefits.
Supreme Court Decision	1936	The production control and financial features of the 1933 Act were declared unconstitutional.
Soil Conservation and Domestic Allotment Act	1936	Provided for payments to farmers who agreed to adopt soil-building practices and shift land from "soil-depleting" surplus crops such as cotton to "soil-conserving" crops such as legumes.
Agricultural Adjustment Act	1938	Provided for mandatory prices support loans and marketing loans keyed to acreage allotments. While the cotton acreage declined considerably, output did not because of increasing yields.
Agricultural Act	1948	Provided for mandatory price support for cotton at 90 percent of parity if producers approved marketing loans. Subsequent legislation extended this level of support through 1954.
Agricultural Act	1954	Renewed acreage allotments and marketing quotas due to increased production and stocks. Marketing quotas continued until 1970.
Agricultural Act	1956	Established the Soil Bank, the objective of which was to: (i) reduce the amount of land planted to allotment crops and (ii) provide long-term retirement of cropland to conservation uses.
Cotton-Wheat Act	1964	Authorized the Secretary of Agriculture to make payments to domestic textile mills in order to bring the price of cotton used in the United States down to the export price. The allotment was also reduced. This Act was the beginning of voluntary program for reducing cotton production.
Food and Agriculture Act	1965	Established a cropland adjustment program and introduced price support, set at 90 percent of estimated world price level. For the first time, trade of allotments with a state was allowed.

continued ☞

TABLE F10 (continued)
A CHRONOLOGY OF THE US COMMODITY PROGRAMS WITH COTTON PROVISIONS

PROGRAM	YEAR	MAIN PROVISIONS
Agricultural Act	1970	Provided for a cropland set-aside program while it suspended the marketing quotas. It also imposed an upper limit of $55,000 on program payments. This limit, however, had no impact as large producers divided ownership of their farms.
Agriculture and Consumer Protection Act	1973	Introduced target prices and disaster payments in recognition that agriculture faces weather and market extremes which can result in low incomes. Payments would be made only if target prices fell below a certain level. The set-aside program continued.
Food and Agriculture Act	1977	Set target prices on the basis of the costs of production and a formula using cost estimates was used for subsequent adjustments. The Act facilitated a shift of cotton production to lower cost regions of the West and Southwest.
Agriculture and Food Act	1981	Focused on price and income support and provisions affecting their adjustment. Support was based on historical moving average of per acre costs and actual yields. The Act also had provisions for acreage reduction. High target prices and weak demand led to large stock accumulation which in turn led to the payment-in-kind program.
Agricultural Program Adjustment Act	1984	Reduced the target price from 86 cents per pound set by the 1981 Act to 81 cents per pound. It also required more land to be set-aside for conservation.
Food Security Act	1985	Retained major features of past programs, namely acreage limitations, nonrecourse loans, and target prices but it gave more power to the Secretary of Agriculture. It specified declining target prices and introduced the concept of deficiency payments.
Agricultural Reconciliation Act	1987	Reduced minimum price to 75.9 cents per pound from 81 cents per pound.
Food, Agriculture, Conservation, and Trade Act	1990	Target prices and deficiency payments continued. It introduced a new 3-step procedure in order to keep US cotton competitive. The second step, the so-called Step-2 payment, is an export subsidy.
Federal Agricultural Improvement and Reform Act	1996	Introduced de-coupled support, i.e. payments based on historical area and output but it retained loan rates. The Act was supplemented by a number of emergency payments during 1999-2001.
Farm Security and Rural Investment Act	2002	Legitimized the emergency payments introduced in 1999. It raised the target prices and loosened the eligibility criteria for support.

Source: Stults et al. (1989) and Glade et al. (1995).

TABLE F11

DIRECT GOVERNMENT ASSISTANCE TO COTTON PRODUCERS, 1997/98-2001/02

	1997/98	1998/99	1999/20000	2000/01	2001/01	2002/03
Total production assistance (million US dollars)						
US	597	1,480	2,056	1,020	3,001	1,996
China	2,013	2,648	1,534	1,900	1,196	750
Greece	659	660	596	537	735	718
Spain	211	204	199	179	245	239
Turkey	na	220	199	106	59	57
Brazil	29	52	44	44	10	na
Mexico	13	15	28	23	18	7
Egypt	290	na	20	14	23	33
Total	**3,812**	**5,279**	**4,764**	**3,822**	**5,287**	**3,814**
Assistance per kilogram produced (US dollars)						
US	0.15	0.49	0.56	0.27	0.61	0.54
China	0.44	0.59	0.40	0.43	0.22	0.16
Greece	1.94	1.85	1.37	1.27	1.72	1.97
Spain	1.82	1.96	1.51	1.90	2.33	2.42
Turkey	na	0.25	0.36	0.12	0.07	0.07
Brazil	0.07	0.10	0.06	0.05	0.02	na
Mexico	0.06	0.07	0.21	0.19	0.20	0.18
Egypt	0.85	na	0.09	0.11	0.07	0.11
Cotlook A Index (July/August Average, US dollars per kilogram)						
	1.60	1.30	1.16	1.26	0.92	1.23
Assistance as a percent of the Cotlook A Index						
US	9%	38%	48%	22%	75%	44%
China	27%	45%	35%	34%	24%	13%
Greece	121%	142%	118%	101%	187%	160%
Spain	114%	151%	130%	151%	253%	197%
Turkey	na	19%	31%	10%	7%	5%
Brazil	4%	8%	6%	4%	2%	na
Mexico	4%	5%	18%	15%	22%	15%
Egypt	53%	Na	7%	9%	7%	9%

a. Data for 2001/02 are preliminary.

Source: International Cotton Advisory Committee (2002 and 2003).

TABLE F12

COTTON PRODUCTION IN EASTERN AND SOUTHERN AFRICA, 1970/71-2002/03

	NIGERIA	SOUTH AFRICA	TANZANIA	UGANDA	ZAMBIA	ZIMBABWE
1970/71	39	19	76	75	4	49
1971/72	38	20	66	75	3	60
1972/73	48	18	77	78	2	51
1973/74	30	40	65	50	1	57
1974/75	52	40	72	31	1	58
1975/76	61	19	42	25	1	47
1976/77	82	35	67	14	3	51
1977/78	40	51	50	20	3	60
1978/79	38	55	56	7	5	57
1979/80	29	65	61	5	9	65
1980/81	27	58	43	4	6	62
1981/82	21	38	40	5	5	56
1982/83	20	27	44	10	12	60
1983/84	13	36	48	12	16	91
1984/85	16	46	31	16	11	103
1985/86	10	47	67	5	12	89
1986/87	28	61	78	3	7	87
1987/88	30	78	54	2	24	116
1988/89	48	78	35	3	12	92
1989/90	41	60	48	4	9	67
1990/91	36	49	85	8	20	72
1991/92	38	20	96	7	9	88
1992/93	63	15	45	9	9	75
1993/94	52	27	40	5	13	60
1994/95	45	24	82	6	9	38
1995/96	60	45	87	10	30	104
1996/97	50	31	62	21	35	101
1997/98	70	42	36	7	42	105
1998/99	65	53	35	15	36	130
1999/2000	50	30	42	22	30	128
2000/01	55	36	45	19	24	152
2001/02	60	18	63	20	35	75
2002/03	55	21	67	22	43	122

Source: International Cotton Advisory Committee, *Cotton: Review of the World Situation*.

TABLE F13

COTTON PRODUCTION IN WEST AND CENTRAL AFRICA, 1970/71-2002/03

	BENIN	BURKINA FASO	CAMEROON	CHAD	COTE D' IVOIRE	MALI	TOGO
1970/71	14	8	14	35	12	20	2
1971/72	18	10	16	41	20	25	3
1972/73	17	12	17	39	21	24	2
1973/74	17	10	10	43	23	19	3
1974/75	12	11	15	53	24	23	4
1975/76	8	18	19	65	26	39	4
1976/77	7	20	18	54	31	45	3
1977/78	6	14	15	45	41	42	2
1978/79	7	22	23	50	47	48	5
1979/80	10	29	31	33	59	56	8
1980/81	6	23	32	31	56	41	10
1981/82	6	22	31	26	56	38	9
1982/83	12	29	29	38	66	50	11
1983/84	17	30	37	60	58	55	10
1984/85	33	34	38	36	88	55	22
1985/86	34	46	45	39	82	67	26
1986/87	48	66	48	34	93	79	32
1987/88	27	59	45	48	114	75	28
1988/89	44	59	69	53	128	97	33
1989/90	43	62	43	58	107	99	36
1990/91	59	77	47	60	116	115	41
1991/92	75	69	47	68	87	114	42
1992/93	69	69	53	47	106	135	42
1993/94	103	51	52	37	116	101	35
1994/95	98	63	63	61	93	128	54
1995/96	141	64	79	62	96	169	42
1996/97	143	90	90	86	114	190	61
1997/98	150	140	78	103	147	218	73
1998/99	123	119	79	64	157	217	78
1999/2000	152	109	79	74	173	197	56
2000/01	141	116	95	58	125	102	49
2001/02	172	158	102	68	173	240	70
2002/03	137	144	83	60	162	200	64

Source: International Cotton Advisory Committee, *Cotton: Review of the World Situation*.

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